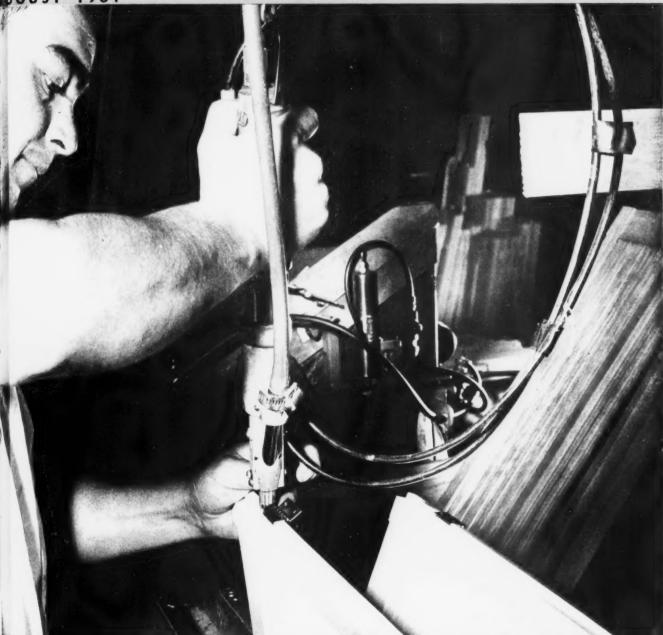
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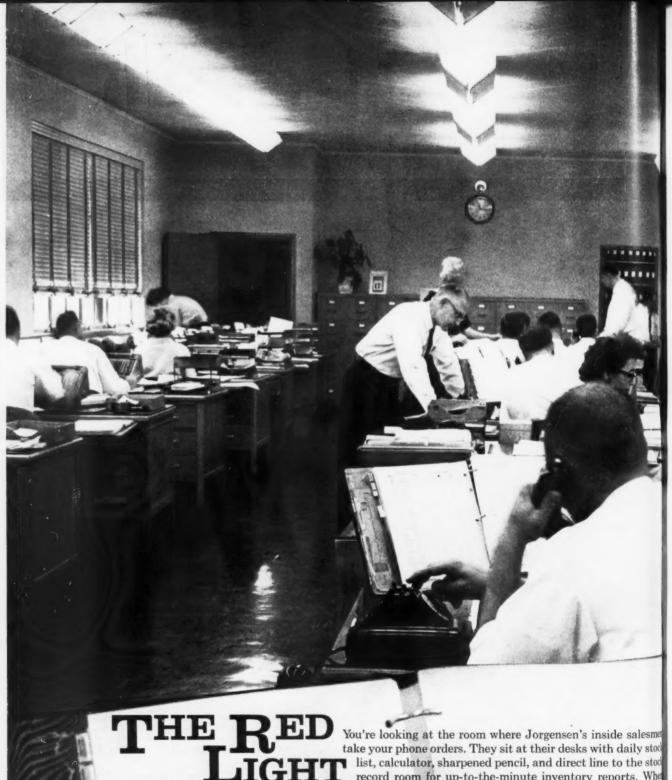
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Automatic power screwdriver speeds production. See page 27.

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Handling Techniques In A Large Electronic Plant 29
Manuals On Plant Lighting 57



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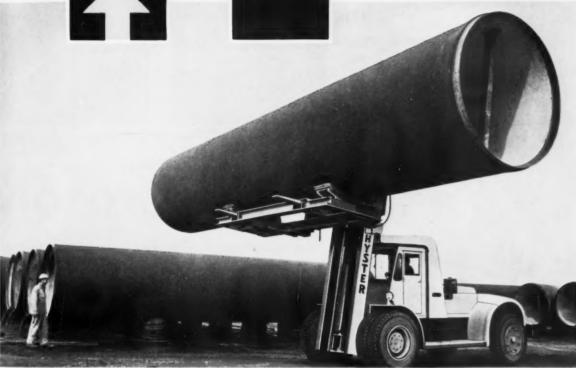
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WESTERN MANUFACTURING/AUGUST 1961



AUGUST 1961

VOL. 26 NO. 8

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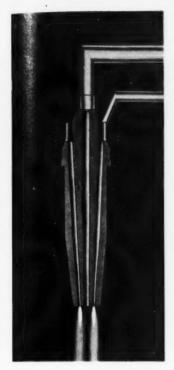
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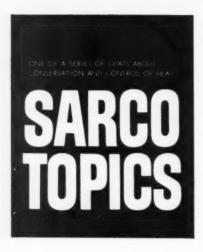
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SO YOU THINK YOU'VE GOT TEMPERATURE CONTROL PROBLEMS

When plant men get together and talk about their temperature control problems, strong men may weep. It's so darned basic—that narrow range of degrees which must be maintained—so closely allied to profit and loss. Let us tell you about one situation that may even top yours, and may clue you in on a good solution. It concerns wine, of all things.

Take those basic temperatures. Wine must be pasteurized at 140°F. Those are the facts of life in the world of wine. They might not seem too difficult to live with unless you are concerned with heat. Then you probably know how tough things can get when you have a rendezvous with a thermometer.

Take New York's Monarch Wine Company, producers of Manischewitz Wines. Their Problem: how to maintain the 140° temperature in the heat exchangers despite wide variations in the rate of wine flow. These variations, between 5 to 60 gallons per minute, result from slowdowns and recoveries in the bottling process. Problem: entire system must be capable of complete shutdown when necessary. Problem: wine temperatures must be raised to 140° as rapidly as possible, sometimes an immediate jump of 100°.

Attracted perhaps by aspects of the situation that had little to do with pure science, Sarco engineers applied the collective experience of Sarco technology to the solution

of this serious problem. The result for Monarch: the degree of control the process demanded—achieved through the excellent use of Sarco Temperature-Pressure Regulators, Float Thermostatic Steam Traps Thermo-Dynamic Steam Traps, and Pipeline Strainers.

Sarco engineers, ever resourceful, divided each of the two large Cherry-Burrell plate-type heat exchanger units into two separate



sections with a blank baffle plate, each with a separate Sarco control. Thermal sensing bulbs were installed in wine discharge and throttling controls hooked into steam supply. As demand fluctuates, one or both regulators function to maintain the 140° temperature. In higher demand, both regulators are operative; as demand drops and flow decreases, only one regulator supplies steam. Pasteur himself would have been elated.

Each of six smaller capacity shell-and-tube heat exchangers required only one regulator, with the sensing bulb inserted into the outlet side of the wine filled shell, and the regulator throttling steam supply to the tube section. Thus, by controlling flow of steam to the exchangers on the basis of pressure and temperature, the Sarco regulators were able to maintain the temperature of the wine at precisely 140° regardless of fluctuations in demand or supply rate. Whew! A lot of engineering went into those two sentences.

From here on it's downhill. To secure complete cut off of the steam supply during scheduled shutdowns of the bottling run, solenoid valves were provided to supplement normal modulating action of the controls. To discharge widely varying loads of condensate continuously and remove immediately all air and incondensible gases, Sarco Float Thermostatic Steam Traps were installed on all condensate outlets. On the drips before each control valve a Sarco Thermo-Dynamic Steam Trap was installed to insure delivery of dry steam. Sarco

Pipeline Strainers were installed before all steam traps and valves to protect them against damage by any foreign bodies. And thus ends a classic story of the grape.

Still, this story has been condensed far too much, really, and we feel you've been cheated out of the story's more delicious details. You needn't be, however. We've printed the facts in detail for posterity and you in Sarco Case History 185, complete with drawings that practically make it a do-it-yourself kit. If you would like a copy, we will be flattered to receive your request, and dispatch it with dispatch.

WE'RE ALWAYS IN... AND THE WELCOME MAT'S OUT

We always take it for granted that if you are going to be in the vicinity of our plant you'll phone or drop us a line so we can invite you to visit us. You'll find that our factory in Bethlehem, Pennsylvania, is on many well-travelled routes, and that our steam laboratory has much to offer in interest and helpfulness. Forgive us for being immodest, but the lab is the most up-to-date of its kind in the country.



When you visit us, don't allow yourself to get sidetracked by the drill presses and automatic lathes. We're proud of this equipment but you've probably seen metal mutilated before, and it's our steam laboratory that's unique. We promise you a good show, and if you have any problems, bring them along. We'll solve them while you wait.

ANYONE FOR KEY CHAINS?

Need a key chain? A tiny replica of a Sarco Thermo-Dynamic Steam Trap, Type TD-50 is attached but you can always remove it if you find it too commercial. There are many things you could use these chains for. Fishing sinkers? Lengthening a light cord? Even holding keys? Anyway, if your Sarco representative is out, write in.

6355

Pardon our monopolizing the conversation in this series of paid communiques, but we're trying our best to interest you in certain subjects that concern us both—to the point where you'll communicate.



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Square deal?

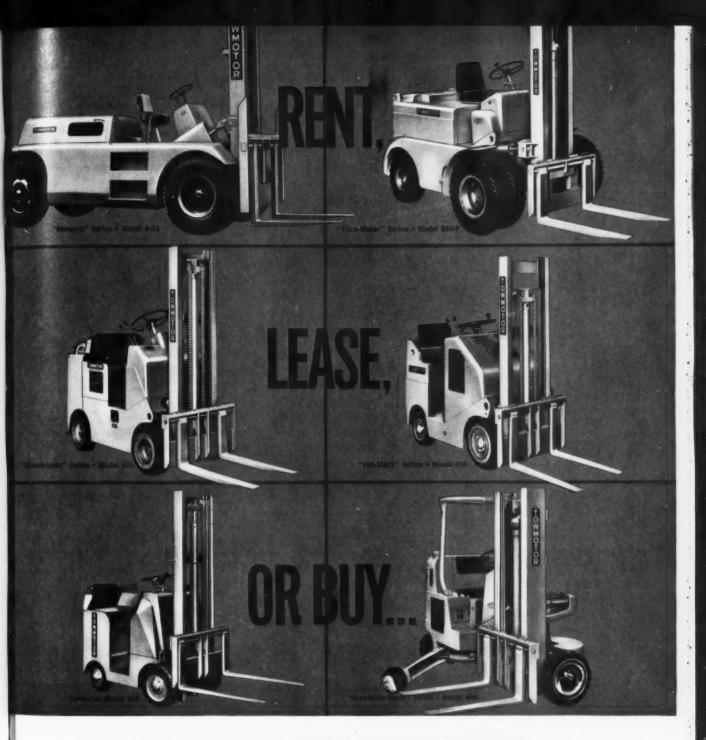
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WESTERN MANUFACTURING/AUGUST 1961



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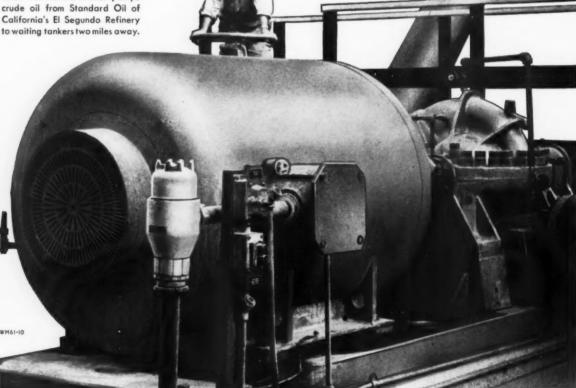
When you need motors that can operate for long periods of time without main tenance . . . that keep right on producing the power you need even under the must critical conditions, choose from these Wagner® Big Job-Rated Morors. Cleck with your Wagner Sales Engineer; he'll show you how they'll solve your large motor problems.

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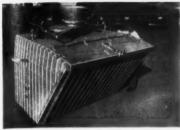
This 500 hp Wagner Type ZP **Tube Ventilated Motor pumps**



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NEW PRODUCTS



CONTAINER FOR HOT MATERIALS

This 6 cu. yd. tilt-type container was specially built to store and handle a high-temperature dusty product. It has cooling fins, a counter-balanced spring-hinged lid and a 16" sliding gate valve. When full it is picked up, hauled and emptied by a Dempster-Dumpster. Details are contained in a free brochure entitled "Special Containers." Dempster Brothers, Inc., Knoxville 17, Tenn.



NEW LFW HANDLES CONTAINERS

This new LFW 603-C, mounted on a White Mustang, was produced to handle scrap metal storage containers. It will handle containers in capacities up to 15 cu. yds. in all Dempster-Dumpster models. Lifting capacity is 18,000 lbs. Dempster Brothers, Inc., Knoxville, Tenn., offers a catalog brief No. 160 describing this and other materials handling systems.

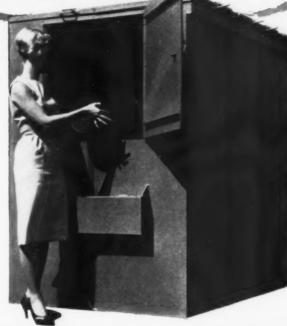


PORTABLE FUEL OIL TANKS

This 2,000-gallon tank was produced for operation at temperatures as low as -90° F. It features its own pump and gasoline engine. Prime mover is a truck-mounted Dempster-Dinosaur which hydraulically lifts the tank into carrying position and puts it off. A new catalog section No. 12 describes the development. Dempster Brothers, Inc., Knoxville 17, Tenn.

Advertisement

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NEWS of MEETINGS

Highlights of the 1961 WESCON Program

THE 1961 Western Electronic Show and Convention in San Francisco during August 21-25 is expected to attract upwards to 35,000 engineers and various management levels of the electronics industry to the Cow Palace during the four day period.

Some 123 formal papers will be presented in 41 sessions, representing the latest in a wide range of technological developments by a broad segment of the nation's top-flight engineering and technical management talent.

The 1961 Wescon technical program is the result of six months of intensive study, correspondence and contacts by a large committee headed by Edward H. Herold, vice president in charge of research at Varian Associates, chairman, and Lucien G. Clarke, assistant director of engineering at Stanford Research Institute, vice-chairman. Here are some of the program highlights.

A major new field in the 1961 Wescon program is that of coherent optical emission, with six papers on this topic. For the first time, the ruby optical maser has been used as an amplifier of light, rather than just as a generator. Papers will treat on both developments. Another paper suggests that by using present generating and detecting equipment (a ruby-pulsed laser) under favorable conditions, it would appear that communications across our entire solar system is feasible. In one session a coherent light radar, known as Colidar, will be set up and demonstrated.

In a new development to be disclosed at the 1961 Wescon, it has been found possible to build an amplifier which uses no electric currents or electrical effects in its amplifying mechanism. Using non-linear acoustical phenomena is a quartz crystal, of the parametric amplification behavior is entirely different from that in conventional solid-state amplifiers, which also will be discussed.

Wescon will have 21 papers in the fields of information, theory and computers. One of the applications of computers stands out as most revolutionary, a very large computer known as "Iliac" is being used at the University of Illinois as a teaching machine. Of even greater interest is the subject this computer is teaching, its own operation and uses.

Three giant particle accelerators are presently being completed in the U. S., one at Princeton, another at Brookhaven National Laboratory and the third at Argonne Laboratories. A complete session at Wescon will cover electronic aspects of each of these begavolt installations.

Another "first" to be heard at Wescon concerns a new industrial radiographic apparatus which produces such high energy, high intensity X-rays that large objects can be examined in short exposures. For example, certain solid-fuel missiles are completely photographed in a few minutes, as against hours needed with prior methods. It appears that this new design, in which a linear accelerator was

San Francisco Bay Engineers Win Award



WILLIAM R. MORRISON (left), outgoing President of the American Institute of Industrial Engineers, Peninsula Chapter, presents an Award of Excellence to the new President, Geoffrey Winkler, at the June meeting at the Red Shack, Palo Alto. The Award, received recently from the AIIE National Headquarters, is for overall chapter development in 1960.

specially developed just for radiographic purposes, will revolutionize a vast part of industrial radiography in which only the betatron has hitherto been available.

Also of general interest with new information to present are several other sessions: one on radio astronomy, two on satellite and space communications, and a session on stereo FM broadcasting. Also being organized is a special evening session on "Technical Aspects of Arms Control."

Material Handling Course

A ONE-WEEK Short Course in Plant Layout, Material Handling, Warehousing and Shipping, presented annually by the Department of Engineering and Engineering Extension, University of California, Los Angeles, has been set at the Lake Arrowhead Conference Center in the San Bernardino Mountains, September 17 through September 22.

Initiated in 1959, the Short Course provides a concentrated lecture, seminar and workshop program for management and supervisory personnel from all industry and business, military and commercial, who have the responsibility for initiating and directing plant layout, material handling, warehousing and shipping activities. Registration, open to men and firms from any area of the United States, is limited in total number to insure full opportunity for individual participation.

In reviewing the necessary fundamentals and presenting new developments and applications within its subject field, the Short Course includes lectures during the morning and afternoon hours to cover current thinking and solutions to problems typically encountered. Evening workshops and problem sessions consider individual problems, with layout and instructional materials provided and the emphasis placed on back-home ap-

(Continued on page 19)

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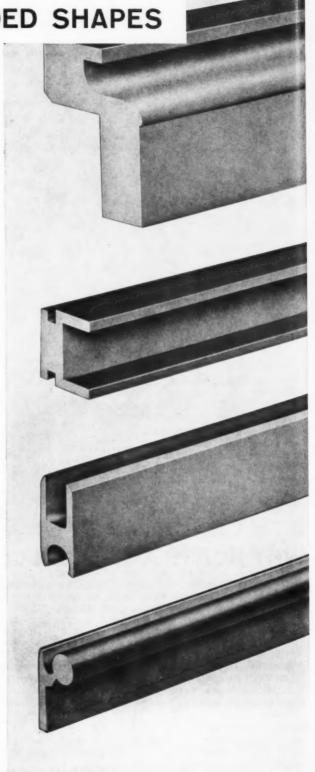
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(Continued from page 16)

plications.

Short course sessions and workshops will focus on such subjects as plant layout planning, material flow analysis, space control, storage space layout, stock location systems, layout analysis and evaluation, game and queueing theories, linear programming, simulation techniques, organization of shipping systems, packaging for safe shipment, and new concepts of traffic management.

Fee for the Short Course is \$125, which includes board and room for the entire week. A complete program and additional information is available by writing to Dr. Sam Houston, Department K, University Extension, University of California, Los Angeles 24.

Computer Conference Scheduled for Sept.

MORE THAN 90 technical papers in 24 formal sessions will be presented at the 16th national conference for the Association for Computing Machinery.

Program highlights of the event, which will attract about 2500 scientists and engineers to the four-day session at the Statler-Hilton Hotel September 5-8, also include eight forum-like "Halls of Discussion," field trips to outstanding Southland facilities, and a number of social events.

A "first" for ACM will be the presentation of exhibits by computer manufacturers, scheduled for the hotel's Garden and Wilshire Rooms. Thirty-three companies will occupy 61 exhibit booths for the showing of the latest in computing components, products, and systems, according to Benjamin F. Handy, Jr., Los Angeles chairman for the national committee.

ACM, the only professional society founded exclusively for people engaged in the science and application of computer arts, has never before included a "hardware" exposition in its program.

The conference will start on Tuesday afternoon, September 5, with opening remarks by Harry D. Husky, president of the society, and Mr. Handy, and then move immediately into the intensive program of technical sessions. At a luncheon on Wednesday, delegates will hear an address by M. O. Kappler, president of System Development Corp. of Santa Monica, one of the world's largest users of computer systems.

The broad range of advanced computer techniques — computer languages, information retrieval, numerical analysis, automated teaching, and new approaches to business data processing — will be covered by technical authors. The "Halls of Discussion," traditionally a highlight of ACM national conferences, will consist of roundtable talks, each moderated by a discussion leader.

Topics for these sessions include "Dividing the Information Retrieval Chores Between Human and Non-Human Automata;" "Mathematical Programming;" "Basic Problems of Computer Installation Management;" "Applied Digital Stimulation;" "Programmer Training;" "Business Data Processing;" "Digital Computing in Medicine;" and "Analog and Combined Stimulation."

Field trips will include tours to Bendix's G-20 assembly areas in southwest Los Angeles, and a trip through National Cash Register's NCR 315 assembly line and test facilities.

The local ACM arrangements committee has reserved a large block of rooms in the Statler-Hilton for visiting engineers and scientists, and has also arranged for dormitory accommodations in Myra Hershey Hall on the UCLA campus. Shuttlebus service will be available from the Westwood campus to the downtown hotel each morning and evening.

Welding Society in Los Angeles Installs New Officers for Coming Year



AL COLLIN of Kaiser Steel is introduced as new Chairman Los Angeles Section, American Welding Society by retiring Chairman John Wiley, Wiley Welding Sales, Inc. Wiley is at right of podium.

INSTALLATION OF OFFICERS night was held recently by the Los Angeles Section, American Welding Society. New Section officers for the next year were introduced and installed in office. The officers are: Chairman Al Collin, Kaiser Steel; Vice Chairman Orville Eichman, N.C.G.; Secretary Leo West, Douglas Aircraft, Inc., Long Beach, Div.; Treasurer R. P. Olsen, Stoody Co.

New Southland Industrial Products Will Be Shown at Exhibit

INDUSTRY ON PARADE has been designated as the exhibit theme of the 1961 New Product Exhibit and Conference sponsored by the Los Angeles Chamber of Commerce at the Ambassador Hotel, September 7-8, 1961.

Specific firms will represent various segments of business activity in the special exhibit to be featured at the two-day conference.

The entire display will be an integrated one with objective of maximum exhibit exposure to the hundreds of executives expected to attend the event.

New products from Southern California firms available for license, manufacture and sale will be prominently featured. Exhibiting will be such leading American companies as Northrop Corp. and NAVAN Division of North American.

 There are 20 separate categories in the Manufacturing Section of the exhibit. They represent the basic industries of the Los Angeles area.

(Continued on page 24)



Stress
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Two sections of penstock for the Carmen-Smith Hydro-electric project are here shown during stress-relieving process in Graver's brand new Stress-Relieving Furnace. Each section is 12'0" diameter x 25'0" long x 1 1/16" thick and is part of 1265-foot penstock installation for the Eugene Water and Electric Board project in the Willamette National Forest near Eugene, Oregon. The penstock is cradled on a specially constructed flat car bed that serves as a bottom for the huge furnace.

The furnace measures $15'0''W \times 15'0''H \times 52'0''L$ — is gas fired and has a heat range of 100° F. to 2150° F. The accessory equipment includes multipoint temperature recorder and four-zone temperature and program control.

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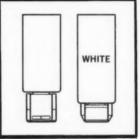
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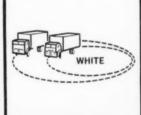
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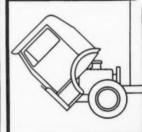
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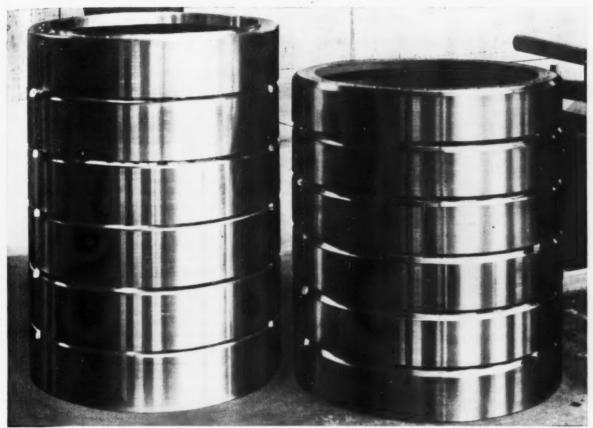
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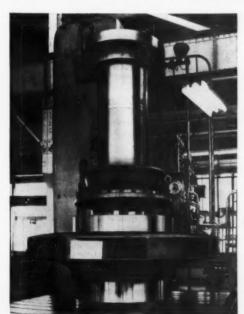
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Stainless steel wear rings manufactured at National Supply's Torrance, Calif., plant for Metropolitan Water District of Southern California pumps. Rings were cast of Armco 17-4 PH stainless steel. Size of largest ring is 431/4" O.D.

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(Continued from page 19)

International Magnetism Conference Is Set for November 13-16 in Phoenix

THE SEVENTH ANNUAL International Conference on Magnetism and Magnetic Materials will be held in the Thunderbird Room of the Westward Ho Hotel in Phoenix, Arizona, on November 13-16.

DR. PETER B. MYERS, local chairman of 7th International Conference on Magnetism and Magnetic Materials.



Dr. Peter B. Myers, local chairman for the conference and staff scientist for Semiconductor Products Division, Motorola, Inc., states that over 1,000 scientists and engineers are expected to attend the meeting. Invited speakers include representatives from Russia, Japan, England and France. As in the past the conference will present papers on basic theoretical and experimental investigations, potential engineering applications, and apparatus and techniques that utilize recent advances in magnetism. Authors desiring to submit papers should do so by August 18 to Dr. F. E. Luborsky, Research Laboratory, General Electric Co., P.O. Box 1088, Schenectady, N.Y.

The meeting as in past years will feature an exhibit of magnetic products and instrumentation.

The conference is being sponsored jointly by the American Institute of Electrical Engineers and the American Institute of Physics in cooperation with the Office of Naval Research, the Institute of Radio Engineers, and the Metallurgical Society of the A.I.M.E.

16th Annual Instrument - Automation Conference and Exhibit

LOS ANGELES will be the site of the Instrument Society of America's 16th Annual Instrument-Automation Conference & Exhibit, scheduled for September 11-15, 1961. Conference sessions will be held in the Biltmore Hotel and the Exhibit will be located in the Memorial Sports Arena.

Over 20,000 instrumentation personnel—representing management, scientists, engineers, technicians, educators, etc. will be in attendance at this internationally recognized event.

"Reliable Information from Underwater to Outer Space" is the Conference theme. Approximately 80 sessions dealing with varied areas of instrumentation will comprise the Conference program. Topics include: measurement standards instrumentation, management, cement and lime instrumentation, strain gage instrumentation, measurement and control, nuclear instrumentation, photographic instrumentation, biomedical instrumentation, education, analysis instrumentation, data handling, marine sciences, shock and vibration, aero-space instrumentation, chemical and petroleum instrumentation, pulp and paper instrumentation, feedback control, and electronic instrumentation, among others.

Eight other technical and professional organizations are cooperating with ISA by presenting sessions as a part of the program. They are: American Chemical Society, American Meteorological Society, California Natural Gas Association, Institute of Management Sciences, Institute of Radio Engineers, Precision Measurements Association, Professional Group on Reliability and Quality Control, Southern California Metering Association, Temperature Measurement Society.

Calendar of Western Meetings

- Aug. 22-25—1961 WESTERN ELECTRONIC SHOW & CONVENTION. Cow Palace, San Francisco. West Electronic Manufacturers Association.
- Aug. 28 Sept. 1 INTERNATIONAL HEAT TRANSFER CONFERENCE. University of Colorado, Boulder, Colorado. Co-hosts are American Society of Mechanical Engineers and American Institute of Chemical Engineers.
- Aug. 30 Sept. 1—AIME SEMICONDUCTOR CONFERENCE. Ambassador Hotel, Los Angeles. Sponsored by American Institute of Mining Metallurgical and Petroleum Engineers.
- Sept. 5-8—NATIONAL CONFERENCE & IN-TERNATIONAL DATA PROCESSING EX-HIBIT. Statler-Hilton Hotel, Los Angeles, Calif. Sponsored by Association for Computing Machinery.
- Sept. 6-8—NEW PRODUCT EXHIBIT & CON-FERENCE. Ambassador Hotel, Los Angeles. Sponsored by Los Angeles Chamber of Commerce.

- Sept. 7-8—1961 NEW PRODUCT EXHIBIT AND CONFERENCE. Ambassador Hotel, Los Angeles. Sponsored by Los Angeles Chamber of Commerce.
- Sept. 11-15.— ISA INSTRUMENT-AUTOMA-TION CONFERENCE & EXHIBIT. Biltmore-Hotel and Memorial Sports Arena, Los Angeles. Instrument Society of America.
- Sept. 13-15—CONVENTION & ANNUAL MEETING PACIFIC COAST GAS ASSOCIA-TION. Coronado Hotel, Coronado, Calif. Pacific Coast Gas Association.
- Sept. 24-28—NATIONAL CONVENTION SLID-ING GLASS DOOR & WINDOW INSTITUTE. Mountain Shadows resort, Scottsdale (Phoenix) Arizona.
- Oct. 4-6—WESTERN REGIONAL CONFERENCE NACE. Benson Hotel, Portland Ore. Sponsored by National Association of Corrosion Engineers.

- Oct. 15-19—NATIONAL CONVENTION PRE-STRESSED CONCRETE INSTITUTE. Brown Palace and Cosmopolitan Hotels, Denver, Colo.
- Oct. 25-27—MEETING OF AMERICAN CERA-MIC SOCIETY. Jack Tar Hotel, San Francisco.
- Nov. 3—AMERICAN IRON & STEEL INSTI-TUTE MEETING. Mark Hopkins Hotel, San Francisco.
- Nov. 13-16—INTERNATIONAL CONFERENCE ON MAGNETISM & MAGNETIC MATERIALS Thunderbird Room, Westward Ho Hotel, Phoenix, Arizona. Sponsored jointly by American Institute of Electrical Engineers and American Institute of Physics.
- Nov. 15-17 19th ANNUAL AEROSPACE ELECTRICAL SOCIETY DISPLAY. Pan Pacific Auditorium, Los Angeles. Sponsored by Aerospace Electrical Society.

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46 MAINTENANCE



AUGUST 1961

VOL. 26 NO. 8



POWER SCREWDRIVER with automatic feed in action. Operator is placing it over predrilled hole and hinge immediately prior to pulling trigger and screwing down screw. Equipment at right of photo is for automatic feed.

AUTOMATIC SCREWDRIVER triples production rate

A hand power tool equipped with automatic feed is used to screw hinges on shutters at this large Western woodworking plant. Equipment has paid for itself in less than a year.

SING AN AUTOMATIC, self-feeding screw-driver for attaching butt hinges has saved close to one-third in direct labor costs and has sharply increased production speed and improved quality for a West Coast woodworking plant. Jaysie Manufacturing Co., Los Angeles, is one of the nation's largest producers of custom designed, movable louvered shutters and room divider panels.

This company has instituted a program of carefully planned mechanization. Every step of the production process is studied for ways in which automatic power machinery may best be applied. While a lot of standard woodworking equipment is used, much of it has been improved by the addition of automatic cycling or feeding. Some is unique and has been designed completely by Jaysie to meet the company's particular needs

Until recently Jaysie had found no way to speed up the attachment of hinges to the shutters. Electric screwdrivers and hand-operated ratchet screwdrivers were used but it was still necessary for the operator to pick up and insert a screw in the predrilled holes after positioning a hinge in the mortise provided. Now an automatic feed screwdriver eliminates all manual contact with screws and has more than tripled the rate at which these fasteners are inserted.





OPERATOR screws down screw at touch of trigger using pneumatic screwdriver with automatic feed. In foreground is feed equipment. Hopper containing screws can be seen. Screws are fed to screwdriver through flexible plastic tubing.

The automatic equipment drives the screws straight and seats head flat. Previously, screws often were driven at an angle, even though pilot holes in the edge of the shutter were straight. Pine lumber is used and location of the holes is ½-in. from the edge of the stile. When driving by hand or with an electric screwdriver, the operator had a natural tendency to guide the screw toward the center of the stile and away from the edge in order to avoid splitting. With the Powasert equipment, made by United Shoe Machinery Corp., there is less tendency to split the stiles. Thus the product has been improved and additional savings have resulted from avoiding wasted material.

To get good holding power in the pine 5%-in., six-wire screw is used. The screw has a standard slot and is threaded its entire length. Holes are prebored to locate the hinge, as exact location is important.

Operator training with the automatic screw equipment has been no problem. Once an operator learned the necessary skills with the machine, he did better quality work.

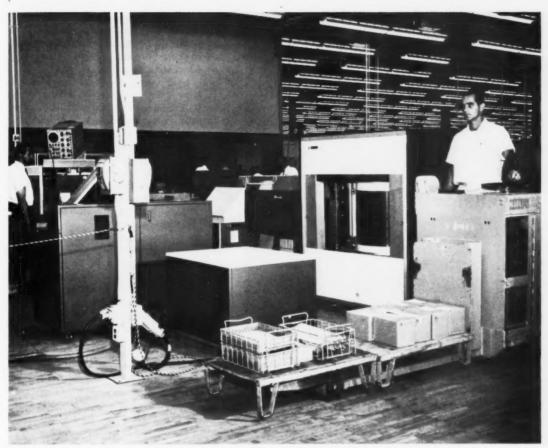
In operation, screws are dumped from bulk containers directly into the machine's power hopper, where they are aligned automatically point-first. Screws are fed through a transparent, flexible hose to the screwdriver, one at a time, through a jam-proof mechanism which prevents double feeding.

The operator pulls a trigger that starts the airdriven rotator, and presses the nose of the tool against the spot where he wishes to insert a screw. Instantly, the screw is driven home. Another screw is immediately fed to the tool, so that it is ready for the next cycle. As fast as the operator can touch the tool to successive spots on the work, the screws are driven home.

Since the operator never touches a screw, he never cuts or scratches his fingers. He never drops any, thereby eliminating not only the considerable waste of fasteners so common to this type of work, but also doing away with the hazard of a littered floor.

From the standpoint of time and labor savings, if a piece of equipment will pay back its cost within two years and it fits into the firm's operations, it is added to the production line. This automatic fastening equipment has paid for itself in less than one year.

CLOSE UP of screwdriver about to drive screw. Screws are fed to unit through tubing and go into screw one at a time through a jam-proof mechanism, which prevents double-feeding. The new equipment has tripled the rate of production on this operation and paid for itself already.



PLATFORM TRUCKS are used to transport skids and tubs of parts from the receiving area to assembly departments. They are capable of handling two skids or two tubs at a time, cutting transportation costs in half.

HANDLING TECHNIQUES in a large electronic plant

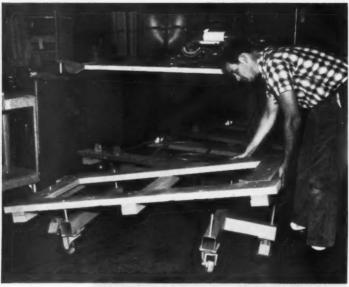
As the volume of production rises in an electronic computer plant, material handling becomes complex. IBM engineers have solved the problem by intelligent application of and blending together basic handling methods.

ANY MANUFACTURING INDUSTRIES as they increase in size and productivity are able to maintain or even improve their material handling efficiency by use of automatic equipment and rigid standardization of products. These techniques are not suited to the electronic industry and in a large electronic plant the handling of parts and equipment can become extremely complex. Such is the case at International Business Machine's San Jose, California plant, where a wide variety of computers, calculators, data processing systems and allied equipment is assembled.

There are several reasons for this. Electronic

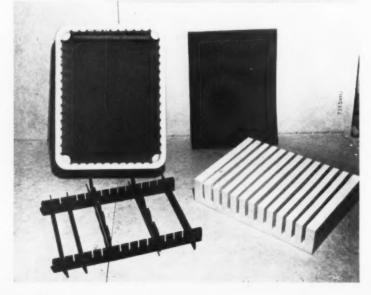
machinery is delicate precision equipment requiring a large amount of hand crafting with an emphasis on quality control. A great many different parts are used. While most of these parts are small in size and light weight a few are not. A complication arises in the fact that a high percentage of all parts are fragile and must be handled with extreme care. Safety is the primary factor and speed of handling becomes a secondary consideration.

In a small electronic plant the handling problem is not acute since limited production of only a few machines at a time permits an individual, almost personal type of assembly. However as production in-



UNIVERSAL HANDLING DOLLY being developed is shown here. Dolly is required to raise working height of machines during final assembly and provide mobility. Because of different machine lengths and widths, a shipping skid has been employed plus a standard dolly that would fit any skid. Worker is attaching dolly to skid.

FLEXIBLE INSERTS are placed in a standard plastic tote box in order to store and transport various types of parts. Use of these inserts eliminates the need for specialized handling equipment. Shown here are types of foam and fiberboard inserts.



creases and is high by electronic standards, particannot be hand toted by individuals. The number of similar parts needed increases to the point when they must be handled in loads. However the number of different parts of various sizes remains the same, and the handling of these many loads becomes a problem. Add to this problem the fact that fragile parts demand special handling and it becomes obvious that the problem is a complex one, not solvable by the use of automatic handling equipment.

Industrial engineering at IBM has been successful in solving their problem. Their approach is an excellent one, well planned and executed. The department has set up three basic goals.

- To develop improved standard handling and storage media with a maximum flexibility and minimum cost.
- To limit special purpose handling equipment to a maximum degree and adopt standard equipment as much as possible.
- 3. To reduce manual handling to a minimum. These basic aims are used as guides in working on plant handling problems and developing new or special items of handling equipment. IBM is extremely conscious of standardization. Wherever possible standard items and equipment are used in the plant and on the machines assembled. Only one factor is more important than standardization; that is quality control. If standardization can be accomplished and quality control maintained, this is done. If not standardization must give way.

The IBM plant at San Jose is basically an assembly plant and is housed in one large building and a smaller one. Parts are received by truck either from sub-contractors or other IBM plants. From the loading dock they go to quality control. The amount of inspection here varies depending upon the nature of the parts. Some parts, which have been inspected already at other IBM plants go directly to storage, or to assembly if needed. Most parts are stored until needed, being picked up from the dock as they come in or after inspection is made. Part storage is located in a separate building, and IBM uses three trucks to run a constant shuttle between it and the plant loading dock. To facilitate handling the dock is equipped with six Globe hydraulic dock lifts. A magnesium ramp is also available for handing trucks with unusually low beds.

Fork lift trucks are used for unloading trucks and handling many of the parts. IBM has four electric fork lifts in the 3000-4000 lb. class for this. Four electric 2000 lb. platform trucks are also used. The latter can handle either two tubs or two skids. Besides these power trucks a number of different carts and special purpose wheeled units are used.

Parts are transported to both sub assembly areas and final assembly areas. Sub assembly areas are by product, but grouped to several products so that there is a flexibility. In general sub assembly is located toward the front of the plant building, with final assembly next and then system test and shipping. Because of the many special problems, production flow is intricate but basically it moves towards the rear of the building.

Industrial engineering's basic theory is to standard

ize as much as possible. Its standardization of neccessity must be flexible. Where standardization is impossible then specialized equipment must be used. A number of pieces of standard equipment are used.

Plastic Tote Pans It has been found that Hollywood Plastic tote pans are suitable for many of the parts that must be handled. After some study, engineering has settled on four standard sizes of pans. To achieve the needed flexibility and handle delicate parts, a number of pan inserts are also used. These include a five sided foam insert (bottom and four sides), slotted foam insert, grooved foam insert, masonite dividers both plain and with different types of notches. The use of foam dunnage for inserts in standard tote pans will save IBM an estimated \$1,200 per year over special containers.

Metal Tubs These are standard throughout IBM plants. They come in one size, are skidded on the bottom for easy handling and can be shipped.

Wire baskets These baskets have been standardized in five basic sizes. They, like the tote pans, are made flexible with inserts.

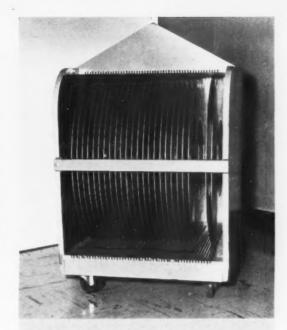
Skids These have been standardized in one size making it easy for platform trucks to handle two of them at a time.

Dollies Under development at the present time is a dolly that will fit the superstructure of any machine being assembled. Many machine frames are now placed on a wooded superstructure, skidded on the bottom to allow handling by fork lift trucks. The superstructure not only provides ease in handling, but raises the machine to easy assembly height. Industrial engineering has developed standard sets of wheels that can be quickly attached to this superstructure. With these wheels the machine is rolled from point to point in assembly and still can be handled by lift truck between departments. The dollies are removed before shipping but the superstructure remains with the machine to aid in shipping.

Portable Lifts, Hoists A number of portable hydraulic hand lifts and small hoists are used in assembly. These are needed to handle and lift to assembly position some of the heavier parts and sub assemblies. The equipment used is standard but requires specialized fixtures for different parts. This allows multiple use of equipment simply by changing the fixture. When a part is out dated or a new and different application comes up, fixtures can be discarded and developed without changing the basic handling device.

While every effort is made to standardize on the equipment to handle parts and machines, standardization must give way when quality control is involved or for some special part that does not lend itself to standard equipment. IBM has developed a variety of equipment for transporting parts that fall in these categories. This is an area where industrial engineers are constantly working to change items to standardized handling methods or to develop better specialized equipment. Here are some of the more outstanding pieces of specialized handling equipment that they have developed.

Wire Basket For Panels The company has standardized its machines so that they all use rectangular plastic printed circuits. These, when inserted into



SPECIALIZED CART for memory storage discs is example of case where standard dollies or carts cannot be used. These discs, because of surface finish, must be stored and transported separated and in a vertical position.

STANDARD LIFT uses specialized fixtures. By being able to easily remove and install a new fixture, various assemblies can be raised with the same lift. Lift use is increased and obsolescence due to product design change is reduced to replacement of fixture.





SPECIAL WIRE CONTAINERS are used for protection of panels, both between operations, and while being transported from one department to another. Wire baskets can be stacked or used individually. Each container can handle any of the various sized panels and any panel can be removed without having to be unstacked.

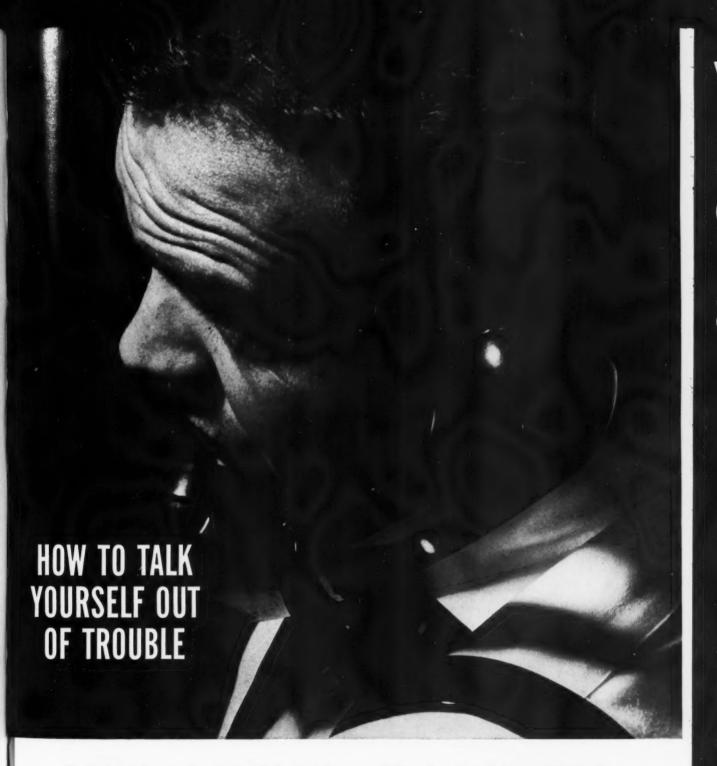
a panel, account for much of the circuitry in a machine. The panels are wired to connect the many different printed circuits. Once wired it is important that panels are not damaged in transport. IBM has developed a special wire basket for this use. Panels hang suspended in the baskets and to compensate for different sizes of panels inserts are used. Baskets are stackable and will fit on either dollies or skids. Usually they are stacked on dollies and pushed around the department as needed. An important feature of these baskets is that the panel can be removed from the end of the basket. As a result taking a panel from any basket in a stacked group is no problem.

It is interesting to note that the use of inserts in this special basket is a move towards standardization. With inserts it can now hold most sizes of panels, and eliminates a number of special containers formerly used to hold panels of different sizes. These inserts have resulted in an estimated initial savings of \$3,500 and industrial engineers are still finding extended applications of the method suitable for other panels.

Storage Disc Cart Some IBM computers use discs for storage of memory data. These discs are critical items and their surface finish must not be marred. To store and transport the discs a special wheeled cart has been developed. Discs are stored on edge and held secure in top and bottom grooves.

Special Cart Many fragile parts are transported on specially designed carts. In general the carts have special fixtures, pegs or padding that allow several similar parts to be individually held and cushioned during transport. They also are used as safe storage for the parts in the department until used. Carts and fixtures vary considerably depending upon the type of part they hold.

As many of the smaller Western electronic firms grow in size, their material handling problems, which now are minor, will multiply in complexity. Handling at IBM does not include widespread use of automatic handling equipment, or huge fleets of industrial trucks. These are neither necessary nor suitable to solve the problem at hand. There is a different type of handling problem here and a different solution is needed. The techniques practised by IBM engineers are both practical and ingenious. They are important in that they represent one means of solving a growing material handling problem in the expanding electronic industry.



Costly breakdowns often start right in the lube room. Before they do, talk to your Standard Engineer. He can recommend the right lubricant to meet your special needs . . . solve problems before trouble begins. For example, Chevron Duraplex Grease-EP may be the answer to expensive lube errors. This versatile grease can be used plantwide to protect many kinds of bearings. The West's largest field force of lubrication engineers is at your service. Call your Standard Man today. His services are free.

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WORKER EFFECTIVELY operates set while holding it in one hand and using the other hand to aid him in working his way down ladder inside cramped manhole. Set can be used by workers inspecting concealed installations.

PORTABLE RADIOS aid plant maintenance men

Douglas Aircraft maintenance men use hand carried radio sets ot relay inspection information from out-ofway places, and make adjustments on plant equipment when it is located at some distance from controls.

PROPER PLACEMENT of a wide range of vital plant equipment is made after considering installation costs, operating efficiency, noise, general employee safety and other factors. Often accessability is the last consideration or one that is bypassed for some other more pressing need.

But the plant maintenance man must service and adjust this equipment regardless of placement and many times in doing so finds himself high on a catwalk or rooftop, deep in a manhole or wedged between ceiling and roof boards. His problem? Communicating with fellow workers who may be half-a-mile away in another building or just on the other side of a wall ready to adjust a control device to correspond with simultaneous adjustments being made on the equipment.

This is a problem faced by many Western plants due to the spread out nature of plant sites. Also, because of closer environmental controls for manufacturing areas, more plants are installing rooftop refrigeration, air conditioning and filtering systems. Consider the problem faced by a refrigeration mechanic on a roof top attempting to communicate with a fellow worker standing by a thermostat deep inside the plant.

At the El Segundo, Calif. Div., Douglas Aircraft Co., workers in plant engineering are equipped with light weight, two-way portable transistor radios that are pocket sized and have proven a help to trouble shooting teams in doing their jobs faster and more efficiently.

First users of the small Manphone 400 transistor sets were refrigeration and air conditioning technicians who are frequently called upon to balance out ventilation systems. As most ventilating units are located on rooftops or overhead areas, this required one member of the two-man crew to be constantly running up and down a ladder or steps or climbing catwalk rigging between the operating unit and the thermostat. The latter, more often than not, located far away in a plant area or office where face-

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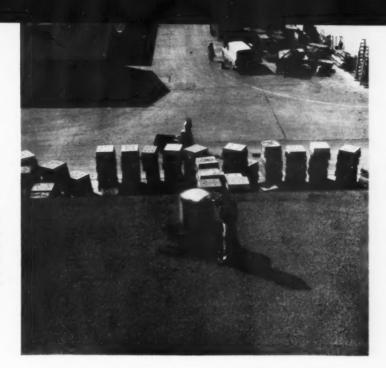


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MAINTENANCE MECHANIC relays information about repairs to rooftop ventilation system to fellow worker on electric truck on ground. Hand carried sets have half-mile effective range.

to-face communication is impossible.

Electricians at El Segundo Div. have used the radio for communications while resetting controls on large capacity milling machines for which master electronic control systems are located in separate rooms.

Recently the transistor sets were used to keep oil

fired boilers in operation during an emergency. The feeder line from the main storage tank broke cutting the fuel supply to boiler room fuel tanks. While repairs were underway, an oil truck serviced furnace tanks and kept the boilers at needed capacity. Control between fuel truck and furnace room was maintained by two-way portable radio.

DELICATE ADJUSTMENT to thermostat is made by air conditioning mechanic who acts on instructions relayed from rooftop by radio. This method of communication saves constant floor to roof climbing, conserves worker energy.





WORKER REMOVES aluminum sign components that have been fired in special furnace for processing porcelain enamel surfaces. Bright area, right rear, is firing tunnel containing quartz lamps and metal reflectors having a bright gold surface. Blower, top of tunnel, is used to control temperatures and to protect quartz lamps from overheating

SPECIAL FURNACE for high quality production

Unit fires porcelain enamel on metal sheets and extrusions. Design includes 29 ft. firing tunnel, conveyor, quartz lamps, gold reflectors and plus or minus 5 degree temperature control.

W HEN MANAGEMENT decided to develop a production line to turn out porcelain enameled aluminum signs at California Metal Enameling Co., Los Angeles, they required a special duty furnace to fire porcelain enamel to aluminum sheets and extrusions

Output from a purchased furnace was considered below quality control standards. Cameo plant engineers huddled with representatives of Ferro Corp. to redesign and engineer a furnace specifically to fire aluminum-type porcelain enamel to metal surfaces.

General Electric quartz lamps with tungsten elements were fitted with porcelain enameled reflectors that had bright liquid gold fired on the PE surface. These lamps were installed in series in the furnace to transmit radiated and reflected heat to the aluminum parts passing through the furnace on a conveyor belt.

Made from stainless steel, reflectors were coated in Cameo's own plant with the high temperature resistant PE surface that meets U. S. Bureau of Standards specification No. 418. After surfaces were treated with liquid bright gold they received a second firing.

The furnace is also lined with stainless steel panels on sides and bottom that have had a similar surfacing operation. Panels were placed directly over the reflecting quartz lamps to intensify reflective efficiency.

Temperatures are controlled to within ±5 degrees

by an Ignitron system manufactured by Research, Inc. Aluminum type PE is fired at 1000 degrees F. in the firing tunnel of the furnace that measures 29 ft. 6 in. long by 7 ft. wide. Top of the firing tunnel is 10-in. above the surface of the metal conveyor belt that travels between 2 and 6 fpm. The average aluminum sign will be fired for 10 minutes and the speed of the furnace conveyor depends on gauge of the aluminum sheet or extrusion. The latter can be fired in one piece up to 24-ft. in length.

Sheet steel can also be processed in the furnace and for this purpose the unit has a maximum heat of 1400 degrees F. To prevent heat dissipation and to allow more uniform heat distribution in the firing tunnel, an air curtain has been placed at the discharge end of the furnace.

Roof panels of the furnace are topped with insulation and a false roof is placed over the insulation to create a chamber that is divided into five sections. A small blower (see illustration) is placed over each section to circulate air and to promote cooling action. Cooling is needed to prevent damage to certain areas of the quartz lamp that must operate below 650 degrees F.

In all, 224 quartz lamps are used, usually two to each reflector. Lamps and reflectors are also placed beneath the conveyor to radiate and reflect heat to the underside of metal parts if required.

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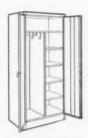
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MODEL 815 Storage cabinet with double door and 4 adjustable shelves.



MODEL 835 with double door ... holds 12 to 16 heavy coats.



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CLOSEUP OF BAG STRAPPING operation shows machine tensioning 12 gauge, .1055-in. OD galvanized wire that runs 33.7 ft. to each pound. Wire has an approximate tensile strength of 100,000 to 125,000 psi.

FIRMS PRODUCING HARD-TO-PACKAGE products that must be shipped to the customer are vitally concerned with in-transit stresses that may render the shipment unacceptable at the receiving dock or difficult and costly to unload.

In-transit wear and tear on packaged products made by Fortifiber Corp., Los Angeles, was caused primarily by stretched or broken flat steel strapping that allowed pallet loads of rolled paper items or bulk packages of paper bags, as many as 3000 to a package, to loosen or spread into a hard to unload shape. City shipments by truck also were damaged in transit by jostling and vibration that caused the flat strapping to cut into protective exterior packaging, thereby allowing the strapping to damage the product.

According to Hubert Spencer, Fortifiber plant superintendent, some of these packages arrived in a condition that required extra time for unloading and the firm was being charged for certain labor costs involved with handling by the customer.

In order to strengthen palletized shipments, Fortifiber turned to round steel strapping supplied in 12 gauge, .1055-in. OD galvanized form by US Steel Supply. A tough wire, 100,000 to 125,000 psi, it offers 33.7 ft. of strapping per pound of shipping weight and will not cut into protective packing despite vibration, movement of a vehicle or handling.

Fortifiber packages are made up primarily of rolls of curing paper, flashing paper, sheathing paper, and a variety of bags for industrial use. The product is secured to an expendible pallet. Pallets of rolled paper items range in quantity from 72 to 110 rolls, the largest pallet weighing 1300 pounds.

Paper bags are shipped in bulk packs on expendible pallets. Lots in the shipment may include 2000 large cannery bags used to house shipments of tin cans, 3000 standard size bags, 2500 multi-wall

for hard-to-package items

This Western firm was faced with intransit wear causing damage to their packaged products. They found a solution in using tough wire strapping that resists stretching and breakage.

rock bags for aggregate, and from 500 to 750 mattress bags.

Of primary importance in packaging such items is the ability of the strapping to withstand breakage and stretching. Wire has less tendency to loosen and allow spreading of bulk shipments into shapes that are difficult if not impossible to unload in one pass by fork truck, according to Spencer.

Palletized shipments are readied by two separate techniques. Rolled items are placed side-by-side on end on the pallet. A sheet of sheathing paper is draped lengthwise and crosswise over the rolls to form a protective hood. Slats of wood, 1 by 6-in, are wrapped around the trailing edge of all four sides of the hood and are secured by one pass of the strapping. Two additional slats of wood are placed on top of the hood and secured by strapping. Packaging time is about 5 minutes per load.

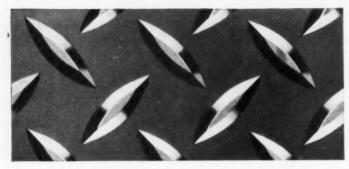
Bulk packages of bags are secured to a pallet and covered by a hood of kraft paper. The package is compressed under a pallet press and subjected to 300 psi. When the package is pressed into shape, strapping is applied to secure it. Labor on this package has been reduced to about 8 minutes.

Workers use a model 13, portable strapper that is air operated and in the case of bulk packages of bags they use a model MS-355 floor type wire container to house the strapping. Tensioning and tieing of the strapping is accomplished by a forward and backward twist of a control knob on the US Steel Supply strapping machine. Tensioning, tieing and cutting sequence takes about 3 seconds.

According to Spencer, the USS strapping unit has cut down on inventory costs as it is a single inventory item since round steel strapping is self fastened and does not require special cleats or clamps. The strapping machine can be operated with a %-in. 1D general purpose 150 psi air hose on minimum air consumption of 30 cfpm at about 60 psi.



OPERATOR SECURES protective hood over 72-roll pallet of saturated kraft sheathing paper. He uses a model 13 pneumatic portable round steel strapping machine made by US Steel Supply. Machine weighs less than 20 pounds.





SUPER SAFETY

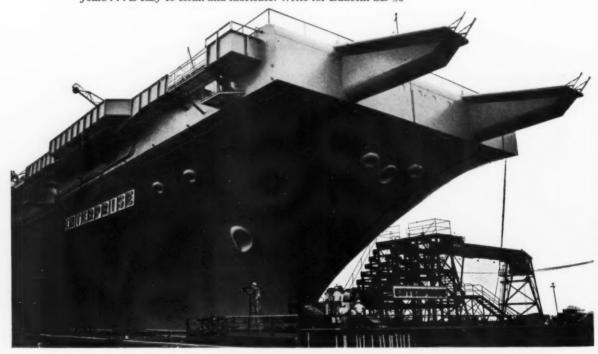
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FIXTURES are effective

This Western manufacturing plant designed a fixture that boosted production 40% and, in addition freed a man for other work in the plant.

ANY MANUFACTURING PLANTS in the West have found that use of fixtures is their best means of slashing production costs. Their volume of production seldom is large enough to justify the cost of automating an operation. Then too, the products manufactured frequently do not lend themselves to the automation process. One answer for most Western plants lies in developing a relatively inexpensive fixture.

An example of how effective fixturing can be, is found at Victor Equipment Company's San Francisco plant, where Karl Heinmann, plant superintendent, has developed an air operated fixture that flame tests cutting tips. Using this fixture a single operator can now inspect 10,000 tips per week. Formerly two men were able to inspect only 6,000 tips per week. This one fixture has increased tip testing production by some 40% and, at the same time, freed a man for other work in the plant.

In their San Francisco plant, Victor Equipment manufactures a line of oryacetylene welding equipment, including welding and cutting torches, valves, regulators, nozzles and cutting tips. The items manufactured lend themselves to production by lots. While lot volume is often sizeable and repetitive, parts vary in both models and sizes and must be processed on equipment sufficiently flexible to handle the variations. In addition quality control is important. All items are 100% inspected.

Cutting tips are a high quantity item, since they wear out and must be replaced by the user. Tips come in three different types, Standard, CD and 500 Series. The three types vary as to their outer diameter and each type is made in a number of different hole sizes. Tips are manufactured in lots of 6,000 to 10,000.

Each cutting tip before it leaves production is individually flame tested on a torch. This inspection is made to eliminate tips that do not seat properly and those drilled with crooked holes. To make the test, the tip must be seated in the torch, the torch lit, flame put through the tip to see from the angle of flame coming out, if the holes are straight. A similar test is made for the cutting oxygen hole, and a flame played around the base of the tip to detect any leak.

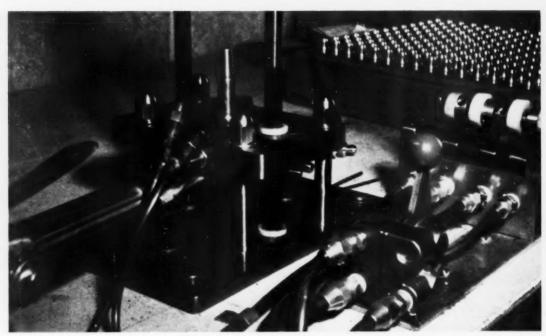
Prior to the development of the fixture, tips were tested by hand using a regular cutting torch and screwing and unscrewing the nut holding the tip in



OPERATOR activates pneumatic control valve on tip testing fixture bringing clamp down over the cutting tip, prior to testing. In photo, clamp has begun its descent and is immediately over tip.

COMPLETE VIEW of tip testing fixture designed by Victor Equipment Co. Pneumatic cylinder that operates tip holding clamp is located below table. At left is cutting torch, which has been integrated into fixture.





CLOSE UP of testing fixture. A tip is in place, ready for testing. Note two flame jets at left of tip and pneumatic cylinder control valve in right foreground. Directly behind it is four way cam activated valve that turns on acetylene and oxygen for torch, lights them and turns them off.

place. This was done to test tips under actual operating conditions.

This new fixture does not change the accuracy of the test. A part of the fixture is an actual cutting torch, clamped solidly in place. A tip placed in the seat points up. The air operated fixture has been designed so that it clamps over the tip flange, taking the place of the nut.

The clamp is air operated on the downstroke, activated by a Schrader 3133A air cylinder, mounted vertically under the table. The cylinder with a 5-in. stroke and a $3\frac{1}{2}$ -in. bore, has a spring return. A 823H Schrader control valve operates the cylinder.

To operate the fixture, a tip is placed in the torch seat and clamped tight by moving the handle on the 823H Schrader control valve. The operator then turns a special, four position, cam operated valve, designed and built by Victor. The valve at successive stations provides the torch with oxygen and acetylene, turns on a pilot light for the gases and at the last station turns off oxygen and acetylene and activates two natural gas jets which play flame around the tip seat.

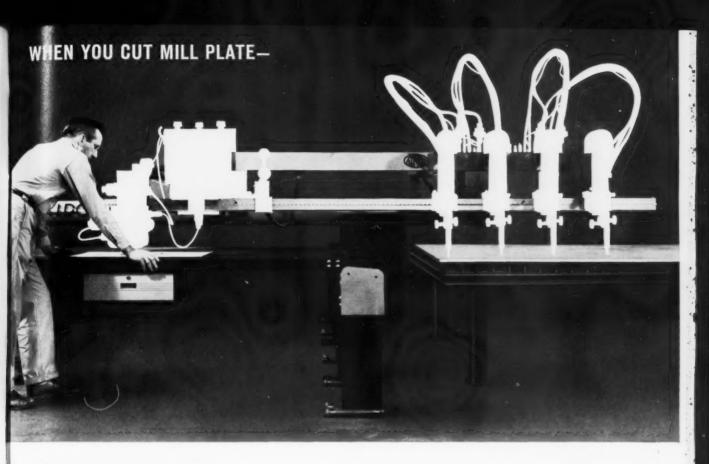
The operator moves the valve handle to the third position and checks the flames through the holes in the tip for uniformity and straightness. If the flames are straight then the holes are also straight. He presses down on the torch handle sending oxygen through the tip's large center hole. This flame is checked in the same manner.

The progressive valve handle is moved to position four and the tip seat checked to see if the gas



PART OF TEST is this inspection of straightness of large oxygen hole in tip. Operator has pressed torch oxygen cutting lever causing jet of flame to shoot out of large hole in tip.

jets have lighted any gas escaping from under the seat. This test is the end of the inspection cycle. The pneumatic cylinder control valve is activated, causing the clamp to raise, and allowing the operator to remove the tip.



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Above: new Airco Linagraph. Airco produces every type of flame cutter — from portables to advanced large automated systems.



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Western Headquarters for Oxygen, Acetylene and Other Gases...Carbide...Gas Welding and Cutting Machines, Apparatus and Supplies...Arc Welders, Electrodes and Accessories



NEW TWO-SPEED Sawzall is demonstrated by John Hiss as he cuts rapidly through heavy gauge pipe at Milwaukee Electric Tool display. A full range of heavy duty electric tools was on view.



BOOTH VISITOR is told of the durability of Kimberly Clark Kimtowls by pretty booth attendant who soaked towels in liquids and put them through series of torture tests without tearing them.



MAINTENANCE SHOW HIGHLIGHTS

Some 6000 persons visited the 1961 Western Plant Maintenance and Engineering Show and attended a two-day technical program held concurrently. Here is what they saw.

TO HEAR ABOUT INNOVATIONS in plant maintenance and engineering and to view the products and services designed to improve efficiency and to cut costs in this field, an estimated 6,000 industrial representatives visited exhibits staged by more than 100 firms, and attended a two-day technical program held during the Western Plant Maintenance and Engineering Show.

The concurrent events took place at Pan Pacific Auditorium and the adjacent Institute of Aeronautical Sciences conference building. Exhibits ranged from the latest in power sweepers capable of covering 120,000 sq. ft. hr. to rapid pipe threading machinery.

Western workers using this type of equipment in plant engineering and maintenance activities represent a \$14 billion dollar industry, show spokesmen indicated, and due to rapidly changing production methods an estimated \$4 billion of this outlay is being improperly allocated and used.

Particularly in the West, plant equipment and manufacturing tools are highly specialized, are changing rapidly and require an adaptable system of maintenance to insure efficient and economic operation. For this reason the show theme was titled "The Need for Specialized Plant Upkeep" and the theme was carried through by technical session speakers such as George E. Keck, vice president, base maintenance, United Air Lines.

"You might call it a fundamental rule of maintenance that nearly every technical innovation in equipment creates a greater complexity of maintenance problems," Keck said.

For example, complexity of new jet and advanced piston-powered aircraft requires the attention of 3500 maintenance workers, some 1000 clerical and administrative personnel at United. "It used to be that a single man could do most of the maintenance jobs on a plane, Keck said. "Now we have a relatively high

SHOWN REMOVING vacuum tank from an Advance floor machine in the Easterday booth is Bert Irick. Tank can be hand carried for dumping, is rapidly re-attached to machine.

specialization of jobs within families of mechanical components or parts, the hydraulic, structural, pneumatic, power plant, etc."

Other subjects discussed during the two-day technical session included air pollution, scheduling, cost control, indirect labor costs, and preventive maintenance.

On the subject of cost control, R. G. Keizur, maintenance planning superintendent, Kaiser Aluminum and Chemical Corp., indicated that planning is the key function in this endeavor. Whether the operation is large or small, effective planning should be utilized. Together with planning, Keizur suggested that accurate records should be kept so that time, costs, and material outlay can be traced. Since initiation of a similar program at his firm, Keizur reports a 50% drop in maintenance expense over a three year period.

Returning to the \$4 billion annual waste in plant maintenance programs, B. J. Sturman, manager, Pacific Coast Region, Westinghouse Electric Corp., manufacturing and repair div., said these losses, unless checked by management, may put some Western firms out of business.

It is obvious, Sturman said, that with the trend of wage and material increases, the function of business that stands still in the realm of cost cutting will find its operations taking too much out of the company profit picture.

Sturman pointed to the interesting increase in the number of maintenance-type workers. Twenty years ago, he said, there was one maintenance man for every 20 men on the production line. Today one maintenance man supports 10 production workers.

"It should be emphasized, Sturman said, that with the increase in automation and sophisticated tools of the modern manufacturing facility, this ratio will increase and maintenance will take a more important share of the company operating dollar."



AT THE CONTROLS of the new HD4400 industrial power sweeper is R. L. Ryan, Sales Manager, Wilshire Power Sweeper.



FITTING SHELVING into place at SPS, Columbia Hallowell Div. booth, is Lamar Johnston who demonstrated the SPS line of Erectomatic double deck shelving for industrial use.



JESSE M. FEW details operation of a Cadillac hand carried portable blower and/or suction unit used to maintain plant machinery and perform such jobs as chip removal from hard-to-reach areas. Device was shown in Clements Mfg. Co. booth.



STANDING BETWEEN two models of Davey compressors, the 100 DW rear, and the 30 DA, is C. E. Flora, left, General Sales Manager, and Gene Myers, Regional Manager.

Western MANUFACTURIN

HELPFUL LITERATURE

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LUBRICATION

136 Centralized lubrication equipment

137

is the subject of this 32-page illustrated catalog. Covers fully automatic, semi-automatic and manual methods of operation. Describes high and low pressure lubricant injectors, timing and alarm controls and filler pumps, as well as installation accessories. Lincoln Engineering Co.

PLASTIC LINING

A new flexible and elastic corrosion resistant plastic sheet material for lining tanks, ducts and other equipment made of steel, wood or concrete, is the subject of this brochure. Covers advantages of its use, fields of application and technical data. Joseph T. Ryerson & Son, Inc.

TUBING 138

Handy 32-page stock list of tubing includes data on carbon and alloy steel tubing; carbon steel pipe, steel tubing shapes, stainless steel tubing, and aluminum tubing holobar and pipe. Kilsby Tubesupply.

MEASURING PUMPS 139

Illustrated bulletin describes pumps in both adjustable and non-adjustable models for metering, injecting, sampling, feeding, mixing or lubricating. The bulletin supplies descriptions, specifications, outstanding features, optional features and dimensions. Airmatic Valve Co.

HAND TRUCKS

Clamp-type trucks for handling boxes, crates, baskets and lugs are described and illustrated in this brochure. Construction features and specifications are given on various models including universal, lock grip, center hanger, car loading and dairy type clamp trucks as well as vertical empty box and plain prong nose hand trucks. FMC, Materials Handling Section.

T-1 CASTINGS

142

Brochure covers the physical and mechanical properties of castings made to T-1 steel composition. Includes data on the welding and machining characteristics of cast T-1 as well as its heat treatment, elevated temperature properties, and corrosion resistance. ESCO Corp.

SILICON-RECTIFIER 143

Brochure about new silicon-rectifier conversion-unit for electrostatic precipitators outlines advantages of the silicon rectifier and explains how it can be installed without replacing any equipment other than the old rectifier. Buell Engineering Co.

TEST GAUGES 144

Bulletin for instrument and process engineers who are concerned with checking and calibrating all types of pressure instruments in shop, laboratory and field. Illustrates and describes master reference gauges, dead weight testers and test pumps, pocket and vacuum test gauges, and inspectors' test sets. Manning, Maxwell & Moore, Inc.

WRENCH, TOOL CATALOG 145

This 128-page well illustrated catalog describes in detail wrenches and hand tools for production assembly, maintenance work and product service. Tools covered range in scope from very small tools, suitable for production work in the electronic field, to large wrenches used in heavy industry. Snap-on Tool Corp.

MARKING METHODS 146

Self-sticking numbers and letters for various industrial marking uses are described in this new bulletin. Over 560 different stock numbers and letters are color illustrated. Includes descriptions of materials, applications and testing samples of three styles of markers. W. H. Brady Co.

PRE-ENGINERED CONVEYOR 147

Bulletin outlines a new concept in the engineering and fabrication of belt conveyors. Discusses major feature of the pre-engineered conveyor which involves the use of local labor and material. Chain Belt Co.

TRUCK LEASING

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Is it better to purchase, to rent or to lease materials handling equipment? This booklet discusses some advantages of leasing and renting lift trucks. Also reports how some companies have profited through a renting or leasing plan. Automatic Transportation Co., Div. Yale & Towne Mfg. Co.

ROOF VENTILATOR 149

Complete engineering data on a new low silhouette centrifugal roof ventilator is contained in this bulletin. Cutaway photo and diagrams show details of aerodynamically designed extruded aluminum discharge vanes and low noise features. Western Engineering & Mfg. Co.

MACHINING ALUMINUM 151

Answers to the most often asked questions on machining aluminum are given in this new brochure. The publication covers speeds used for machining aluminum on screw machines, alloys with best machinability. recommended coolant-lubricants and information on tool materials and angles. Reynolds Metals Co.

HYDROGEN GAS PRODUCER 152

How a hydrogen gas producer can provide a steady source of high purity hydrogen gas with material costs about 10% that of cylinder gas is explained in this brochure. Discusses applications in metallurgical, chemical and food processing industries, and lists specific applications for the low cost atmosphere in these industries. General Electric Co.

SPEED CONTROL

Revised brochure on speed control systems incorporates the advances made in central control instrumentation and panel design, and in signal transmission methods within processcontrolled automatic systems. Covers 12 typical systems that are illustrated in three dimensional schematic drawings. Lists applications. U. S. Electrical Motors Inc.

PNEUMATIC CONTROLLERS

Bulletin describes design features of new advanced design pneumatic controllers. Block diagrams and cutaway drawings are used to explain how the unit works and how it is employed in various control applications. Bristol Co.

TOOLING 155

New 50-page illustrated catalog on tungsten carbide tooling features new sizes and styles of tooling added to line. These include T-Max disposable insert turning tools, new inserts in both ground and ground and honed grades and a new design T-Max profile toolholder for copying lathe application. Sandvick Steel, Inc.

SELF-SEALING COUPLINGS

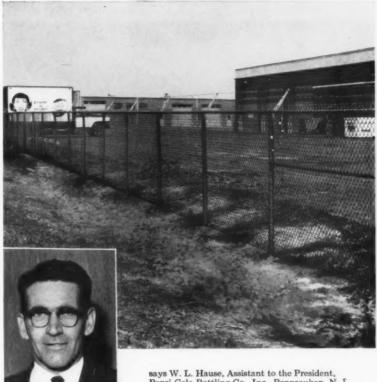
Handy 20-page booklet is devoted to a discussion of the basic applications possible with self-sealing couplings. The booklet is well-illustrated with simple, easy-to-understand drawings, and is prepared chiefly to acquaint the engineer or technician with general information on the uses of self-sealing couplings in fluid piping systems. Aeroquip Corp.

PARTS FAILURES

Technical paper summarizes the results of two-year investigation of unexplained failures of precisely engineered metal wear parts and bearing surfaces. More than 8000 new and failed precision wear parts were studied. Includes numerous photomicrographs of the metal surfaces analyzed. Electrolizing Co., Div. Advance Industries, Inc.

WIRING CONDUIT

A flexible, liquid-tight electrical wiring conduit is described in this brochure. Discusses advantageous features of the conduit, construction, many uses, sizes and specifications. Anaconda Metal Hose Div., Anaconda American Brass Co.



Pepsi-Cola Bottling Co., Inc., Pennsauken, N. J.

... makes a safe outdoor 'garage' for our 45 trucks..."

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Literature Advertised In This Issue

Rectifiers for Welding 43

New and interesting pamphlet about selenium rectifiers. Page 53, Miller Electric Mfg. Co.

Drum Cradle Truck

Literature on cradle truck for 55 and 100 gal. drums. Page 85, Morse Mig. Co.

76

Welders

Literature on Miller Gold Star SR or SRG welders. Page 53, Miller Electric Mfg. Co.

Drum Hand Truck

Data about a one-man drum hand truck that can pick up a 1,000 lb. load. Page 85, Morse Mfg. Co.

Industrial Fences 30

Catalog gives information on how Anchor Fence can help your operation. Page 49, Anchor Fence

Drench Showers 52

Catalog covers important safety features of Haws drench showers. Page 62, Haws Drinking Faucet Co.

All-Metal Flexible Hose

New catalog illustrates and describes a wide range of all-metal flexble hose and assemblies. Page 82, Universal Metal Hose Co.

Power Transmission Units 71

Illustrated catalog shows numerous stock models. Complete data. Page 82, Hub City Iron Co.

Fire Hose 63

Catalog on lightweight neoprene covered fire hose. Page 77, Goodall Rubber Co.

Wire Cloth

Complete information on wire cloth for screening, filtering, grading. Page 51. Colorado Fuel & Iron Corp.

Mounted Wheels 17

New catalog gives hundreds of combinations of shape, grit, size porosity, bond and mandrel size. Page 7, Bay State Abrasive Products

Floor Plate 36

Bulletin about Super Diamond floor plate for safety. Page 42, Alan Wood Steel Co.

Ball Valves

Catalog gives complete data and specifications on ball valves. Page 52, Pacific Valves, Inc.

Storage Cabinets

35 Complete information on new storage cabinets. Page 39, Columbia-Hallowell Div., SPS

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Waste, Refuse Storage

Brochure describes plant-owned system or private hauler service for waste and refuse. Page 15, Dempster Brothers

Pump Literature

Six valuable bulletins on high pressure pumps. Page 68, John Bean, Div. Food Machinery and Chemical Corp.

Industrial Gloves

78 Catalog of illustrations, application data on industrial gloves and garments. Page 87, Wicx-Merit Glove

Casters and Wheels 65

Fully illustrated manual includes specifications, complete information. Page 79, Darnell Corp., Ltd.

Blower-Suction Cleaners

New bulletin gives data on four portable, versatile models. Page 62, Clements Mfg. Co., Blower Div.

CHAIN DRIVES

This new bulletin features easy-tofollow chain drive selection procedures for stock industrial chain lines. Data in seven selection tables is arranged to provide quick determination of chain sizes, sprocket sizes, center distances, chain lengths, and the ranges of both ASA roller chain stock sprockets and Chabelco sprockets. Chain Belt Co.

CASTERS AND WHEELS 162

Compact and easy-to-use catalog contains complete descriptions, full illustrations and important technical data on hundreds of casters and wheels in styles, sizes and capacities to meet the widest range of industrial requirements. The 48-pager also includes helpful information on caster and wheel construction, selection factors, mounting arrangements, materials and accessories. Hamilton Caster & Mfg. Company.

BETTER CLOSURES

161

Comprehensive 20-page booklet describes and compares commonly used methods of bottom closing regular slotted containers and other corrugated boxes. Covers machine and hand gluing, taping with kraft-backed and reinforced materials, stapling and stitching. Presents advantages and shortcomings so closure methods may be evaluated in reference to particular plant operations. Acme Steel Co., Acme Steel Products Div.

AIR COMPRESSORS

Catalog gives data on more than 200 models of air compressors for automotive, industrial and contractor applications. Discusses features and includes illustrations and descriptions of compressors with either horizontal or vertical tanks. Cross-sectional shows basic compressor and loadless starting device. Lincoln Engineering Company.

DESCALING BOILERS

163

New bulletin explains how to descale power boilers chemically and discusses main advantages of controlled chemical descaling. Includes a technical description of selected chemical materials used successively in boiler descaling operations and outlines a recommended descaling procedure complete with safety precautions. Oakite Products, Inc.

RUBBER SHEET PACKING 166

New brochure covers general purpose sheet, diaphragm sheet, Neoprene sheet, and Nitrile sheet styles. Complete data are given for each, including construction, recommended applications, ASTM and MIL specifications met by the packing, Durometer hardness, and temperature and pressure services. A handy table gives widths and approximate weight in pounds per square yard. Johns-Manville, Packing Materials Div.

HIGH VACUUM PUMPS

This 54-page manual is a well-illustrated and documented treatise on high vacuum vapor pumps. Explains key to high vacuum; covers performance characteristics; selection; and complete technical data on vapor, metal mercury, glass oil and glass mercury pumps. Also special pumps and pumping systems. Consolidated Vacuum Corp.

167

SPROCKETS 168

Sprockets with shear pin hubs and split taper bushings that are available off the shelf, are covered in this brochure. Discusses advantages of design, includes complete specifications and engineering data. Browning Mfg. Co.

BLOWERS 169

Cast iron and fabricated steel blowers and exhausters are described in this 16-page booklet. Illustrates standard application units as well as many units built for special installations. Through cross section, important manufacturing features are clearly shown and a special section is devoted to engineering data used in designing a blower application. Lamson Corp.

CREATIVE FRAMING 17

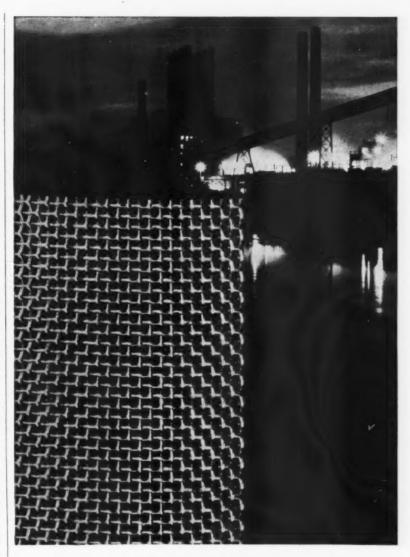
Profusely illustrated 23-page booklet stresses the design versatility, assembly speed and structural strength of slotted angle as a framing material. Shows how slotted angle can be used for storage racks, shipping containers, carts, mezzanines and access equipment, tables and building framework. Acme Steel Co.

POLYCARBONATE FILMS 172

Technical report details the physical and electrical properties of polycarbonate films. The 13-page report compares extruded and solvent cast films and lists suggested application. Chemical Materials Div., General Electric Co.

FORK LIFTS 173

Fully illustrated bulletin describes new heavy-duty fork lift truck line in gasoline, diesel and LP-gas powered models with capacities from 10,000 to 24,000 lbs. Also covers larger capacity series comprised of nine units, with capacities ranging from 24,000 to 45,000 lbs. *Towmotor Corp.*



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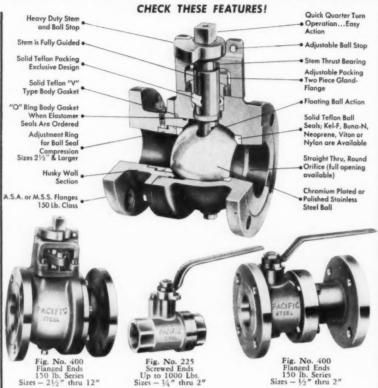
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METAL CLEANING

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W

Brochure lists specialized surface preparation products for metals. Describes soak tank cleaners specifying on which metal the product is to be used, also electrocleaners, pickling acids, an emulsion cleaner, and products for paint preparation, for aluminum processing, for stainless steel, spray cleaners and paint strippers. Diversey Corp.

EPOXY INSULATION

175

Fold-out brochure gives full information about a flexible, but tough, room temperature cured epoxy casting compound that protects motor stator windings against moisture, dirt, abrasion, impact, chemicals and other contaminants. *Hysol Corp.*

STRAPPING ACCESSORIES 176

New tools, sealers and accessories for use with rayon cord strapping are described and various applications illustrated in this brochure. Charts give types, widths and length of available rayon strapping, also shows strength comparisons with metal strapping. Industrial Packaging Dept., American Viscose Co.

PRECIPITATORS

177

This illustrated bulletin is devoted to a discussion of the air pollution problem and how it is solved with electrostatic precipitators. Principles of electrostatic operation are described; an easy-to-follow three-color schematic drawing illustrates the operating principle description. American-Standard Industrial Div.

BUILT-UP ROOFING 178

28-page manual lists data and specifications of bonded built-up roofs. Includes selector guide, general requirements for built-up roofing specifications on nailable and non-nailable decks and materials. Application data includes details on steep deck and dead level roofs, spray pond roofs, insulation and joint sealing details. Philip Carey Mfg. Co.

DRILL, TAP HOLDER 179

Bulletin about a new drill and tap holder that permits power feed tapping operations on horizontal-and-vertical-spindle machines not equipped with thread leads or not having leads that match those of the tape. Giddings & Lewis Machine Tool Co.

TURKS HEADS

181 Comprehensive catalog on Turks heads, adjustable draw plates, that are used for forming accurate squares and rectangles directly from round wire and finishing special shapes or forming edge contours on flat metal ribbons. Contains detailed data on uses and applications, size control, surface finish, basic types, pull-through power

sources, wire shaping mills and case

182

184

NUMERICAL CONTROL

histories. Fenn Mfg. Co.

This 32-page booklet, illustrated with photos, charts and graphs, presents valuable educational data about the growing machine tool-numerical control field. In relating the history and development of metal removing machines and numerical control, the booklet defines the meaning of numerical control and explains the use of punched tape in machine tool applications. Friden, Inc.

COUPLINGS 183

Flexible cushion couplings that absorb vibration and compensate for all combinations of shaft misalignment and end float are described in this 24-page bulletin. Includes product photos, engineering drawings and installation pictures with descriptions of standard, high speed, and flywheel types. Charts horsepower ratings, dimensions and weights. Dodge Mfg. Company.

INDUSTRIAL X-RAY

This 25-page booklet contains comparison tables of five X-ray films, technical data and sensitometric curves on each of the five films. Also contains charts showing suggested exposures for magnesium, aluminum, steel and bronze, along with exposure charts for cobalt 60 and iridium 192 with steel. Gevaert Company.

TRUCK ENGINEERING

Brochure describes special engineering service to help cut costs for industrial truck users. Shows a dozen typical examples of actual production problems solved by special mechanical handling equipment recommended through the engineering service. The problem, solution, and photo of the machine in action are presented for each of the cases. Elwell-Parker Electric Co.

ALCOHOLS

New 80-page booklet describes the properties and uses of 21 industrial alcohols. Included is information on physical properties; constant-boiling mixtures; specification limits; test methods; storage, handling, and shipping and toxicological properties. Special sections describe ethanol in proprietary solvents, alcohols for chemical specialties, performance of alcohols in coatings, and performances of plasticizers. Union Carbide Chemicals Co., Div. Union Carbide Corp.

PRESS MODERNIZATION

194

Three different approaches to power press modernization are presented in this brochure. Bulletin compares economic and engineering advantages of power press conversions incorporating air clutches and brakes through complete engineering of new press drive systems, combining new power transmission units with reconditioned components, or adding new power transmission components to existing drive systems. Fawick Airflex Div., Fawick Corp.

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Write for descriptive literature on the Miller Gold Star SR or SRH, or see your local Miller dealer for a demonstration on the how and the why of the "More You Get With a Miller." He proves it! Also available upon request is a new and interesting pamphlet "Rectifiers for Welding" - which you should have.

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Forty bushels happens to be the capacity of the extra-large bucket on this H-25 "PAYLOADER" tractor-shovel. The bucket is accurately sized to scoop up and carry 2,000-lb. loads of cottonseed meal from storage to bagging machine, but also handles bulk cottonseed and cottonseed hulls.

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ASSEMBLY TOOLS

130

Sixteen-page catalog gives information about automatic or semiautomatic electric assembly tools and how the tools may be used for staking, swaging, riveting, punching, marking and terminal setting. Explains operation and describes the different ways and areas in which the tools may be used. Black & Webster, Inc.

MAINTENANCE

191

Handbook about an industrial vacuum cleaner describes 79 costcutting uses from the one machine.
Booklet suggests new ideas, improved ways to accomplish dozens of tedious jobs more easily and economically.
Fully illustrated. Breuer Electric Mfg. Co.

FAST-ASSEMBLY

192

Brochure gives concise data about a new rack designed and engineered for those who require racks in a hurry. Includes detailed drawing of the rack which is flexible in serving as a pallet rack or heavy-duty shelving. Paltier Corp.

PLASTICS MOLDING 193

Booklet outlines the comparative merits of automatic versus semi-automatic molding of thermosetting materials, and clarifies some popular misconceptions about the automatic processes. Illustrates and describes the units beginning with 25-ton capacity models, and gives features, advantages and specifications of each. Dake Corp.

FASTENERS 194

Engineering prints on fasteners for effective elevated temperature use are illustrated in this revised catalog. Covers general characteristics and physical properties. Fasteners described are fabricated to AMS5735 for 1300 degree to 1800 degree applications. Mercury Air Parts Co., Inc.

CASTERS 19

Construction features of two new caster lines are outlined in this brochure. Gives full specification data on new medium duty Series 40 swivel and matching Series 41 rigid types available with seven different kinds of wheels and medium heavy duty Series 50 swivel and matching Series 51 rigid types in eight wheel types. Nutting Truck and Caster Co.

FLOOR MASTICS

196

Installation features and special advantages of industrial mastic flooring and underlayments are described in this bulletin. Includes a comprehensive, illustrated discussion of construction methods for laying the material. On-the-job photos show typical installations in factories and warehouses. American Bitumuls & Asphalt Co.

POWERED CONVEYORS 19

New 88-page reference book on powered conveyors incorporates the indexing features of a catalog and the factual presentation of an engineering handbook. Arranged so that it is easy to find specific conveyor components for certain types of material handling applications. Profusely illustrated. Lamson Corp.

TOOL CATALOG 1

Third edition presents in 480 pages more than 3,500 tools. Arranged for quick reference with sections on mechanics' hand measuring tools and precision instruments, dial indicators, dial gauges and instruments, special tools, hacksaws, hole saws, band saws, band knives and precision ground flat stock. L. S. Starrett Co.

SPRING PINS 199

Complete data on spring pins, including design and performance information is contained in this bulletin. Illustrates and describes 16 different applications and suggests many more uses for the versatile self-locking fastener. Standard Pressed Steel Co.

THICKENERS 211

New 24-page illustrated brochure describes thickeners for chemical, metallurgical and industrial processing. Single and multiple compartment thickeners are described having both center-drive and perimeter-drive rakes in a variety of configurations for unit operations in all the process industries. Dorr-Oliver Inc.

WELD CLEANING 212

Brochure details specifications of disc-center and cup brushes for removal of rust and surface dirt before welding, weld cleaning, and preparation of metal surfaces for painting. Describes eight-inch and smaller brushes particularly designed for use on high-speed air and electric tools. Osborn Mfg. Co.

DC ARC WELDER

213

New bulletin describes performance features and construction details of three-phase rectifier DC arc welder. Covers applications for manual and semi-manual welding. Includes specifications. *Lincoln Electric Co.*

SHELL-TYPE MOTORS 214

Bulletin about shell-type motors in open, enclosed or liquid cooled ratings ranging from one-half to 150 hp. Discusses mechanical and electrical features and ventilation data. Illustrated. Louis Allis Co.

PNEUMATIC SEALER

215

A hand tool designed for applying seals to all sizes of regular-duty steel strapping is contained in this bulletin. Details and brief application information are included. Acme Steel Co., Acme Steel Products Div.

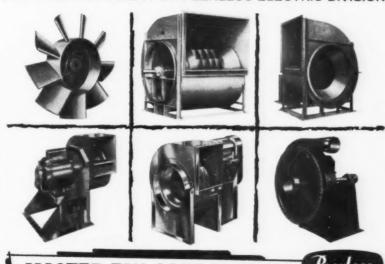
SILICONES

216

A production-engineering guide to the silicones most useful in the production of rubber and plastic materials, and in the manufacture of rubber and plastic parts. *Dow Corning Corp*.



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ORDER PICKING

Attractive booklet illustrates the importance of live storage as automation increases. Shows how order picking frontage as well as time and motion can be cut. Includes application photos of bin arrangements and conveyor types. North American Equipment Corp.

217

218

SEMI-STEEL VALVES

Specifications and dimensions are given for all sizes of semi-steel straightway, steam jacketed, multiport and special valves in this 43-page booklet. Accessories described and illustrated include wrenches, locking devices, extensions, lubricants and a new gun device for lubricating valves. Rockwell Mfg. Co., Nordstrom Valve

MILLING MACHINES 219

This 20-page bulletin presents complete specifications, including illustrations covering construction features, operations and optional equipment for new universal milling machines. The machines described are available with either 3, 5, 7½ or dual 10/5 hp spindle drive motors. Machine Tool Div., Brown & Sharpe Mfg. Co.

MATERIALS HANDLING 221

How a public warehouse, planned and built from 50 years of practical experience, maintains 24-hour high speed distribution is the subject of this new case history bulletin. Illustrated with action photos taken at the newly built warehouse, all phases of the operation are also described. Lewis-Shepard Products, Inc.

ZIRCONIUM

The corrosion resistance of zirconium is the subject of this booklet. Contains detailed graphs for over 100 highly corrosive media. Alphabetical listing of the corrosive media provides ready reference so the booklet is a useful tool for those interested in improving a product or process involving corroson resistance. Zirconium Association.

MACHINE TOOLS 223

Revised 48-page catalog describes light-heavyweight machine tools and accessories including drill presses, grinders, cut-off machines, band saws and belt and disc surfaces. Covers new introductions and complete specifications. Photos and drawings

supplement the text. Walker Turn r Div., Rockwell Mfg. Co.

CORROSION RESISTANCE 224

Various kinds of corrosion and the different metals suited to resist them are given a thorough review in this 24-page illustrated brochure. Written to help manufacturers build corrosion resistance into their products and properties, the guide analyses the seven basic types of corrosion and shows what specific kinds of metals best resist them. H. M. Harper Co.

PRECISION TOOLS

Three types of tools which allow precision adjustments in tenths without loosening or tightening any screws are presented in this catalog. Fully illustrated with phanthom and exploded views, the tools are shown as applied to precision boring quills, double and single bearing type tools, and eccentric tandem type for block tooling and other applications. Briney Mfg. Co.

226

MANIFOLDS

Comprehensive catalog describing industrial gas manifolds of both stationary and portable types. Includes 21 stationary manifolds designed for use with oxygen, acetylene, argon, nitrogen, methane, propane, helium. Contains dimensional layouts and many illustrations of actual manifolds are shown. Linde Co., Div. Union Carbide Corp.

SWITCHES 22

Precision switches for high temperature locations are described in this bulletin. Briefly outlines several of the many switch types which provide precision snap-action switching in both high and low temperature extremes for military, industrial or commercial applications. Micro Switch Div., Minneapolis-Honeywell Regulator Co.

COUPLING ADAPTERS 229

Brochure on flexible flanged coupling adapters gives detailed information on how these fittings can be incorporated into the design of water, sewage, or gas systems or used for "cutting-in" flanged fitting installations in existing pipelines. Design drawings show how these products enable flanged meters, valves and regulators to be quickly installed or removed. Smith-Blair, Inc.



PLANT LIGHTING

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SPECIAL MANUALS

PLANT LIGHTING is a subject of extreme importance to Western manufacturing firms, and one field where Western plants are substantially ahead of those in the rest of the country. Two factors have been responsible. Western plants are newer than those in the east. Western industries like electronics and space and missiles require excellent lighting for much of their production and assembly.



FOOTCANDLE LEVEL in sheet metal production area of Lighting Dynamics, Inc. is in excess of 175 footcandles. The recently completed West Coast subsidiary of John C. Virden Co. at City of Industry, Calif., is a model of a well-planned and equipped manufacturing facility, unique in that it helps sell the industrial lighting equipment manufactured.

Despite the fact that plant lighting here is generally superior to that used elsewhere, many installations can be improved and there is a greater need for these improvements to be made. Often these improvements can be accomplished at very little if any increase in cost.

The lighting field in a few short years has seen the development and placing on the market of many new and improved products. Some of these are: light bulbs greatly reduced in size, yet emitting 5% more light at no increase in bulb or power cost; fluorescent panels in square shape that spread light more evenly; mercury vapor lamps with a new electrode that lasts 40% longer and provides the customer 25% additional light; high efficiency fluorescent lamps that produce 3200 lumens as compared to 2800 for ordinary 40 watt cool white fluorescent lamps; lighting fixtures designed for specific jobs by computers; and a new highly reflective metal called "Dynasyl" that is not impaired by any fabrication.

In addition to these many new lighting developments we are seeing considerably more lighting research, research that is aimed at determining the most suitable installation for specific industrial needs. On-the-job installations can now be simulated and tested in the laboratory prior to installation, and merits of various types of materials and fixtures evaluated.

With improvements in equipment and an ever increasing knowledge of how to best solve industrial installation problems, the lighting field has forged ahead rapidly in recent years.

Some of the leading companies in the lighting field have investigated industrial lighting from the plant stand-point and can offer much valuable information on bulb replacement and maintenance. Their research on these problems of when to replace and how to replace can save you money.

Western manufacturing engineers, if they have not recently done so, will find that a reevaluation and investigation of their plant lighting is time well spent. Correct lighting for an operation saves money in increased production and fewer rejected parts. With the many types of improved lamps on the market, improved lighting throughout the plant could possibly be achieved at little cost. There is a cost-saving factor too in following correct lamp replacement procedures.

LIGHTING LABORATORY at Hexcel Products, Inc.,

at Hexcel Products, Inc., Berkeley, Calif., where luminous ceiling material is tested and evaluated to determine more accurately the amount of useful light in a room. The lab has three adjustable overhead components that are automatically controlled and are designed so that lighting problems in a real room can be duplicated.



Because of the importance of lighting to Western manufacturing plants and the rapid improvements being made in this field, the editors of WESTERN MANUFAC-TURING have compiled for your use on the following pages a number of the more important manuals on lighting offered by leading companies in the field.

Semi-direct Contoured Reflector Luminaires

Data about a reflector luminaire that cuts direct glare, controls contrast, and is designed to take full advantage of industrial interiors. Includes illustrations, dimensional and application information. Smoot-Holman Co.

Lamp Maintenance

Bulletin explains how a systematic replacement of the lamps in a lighting installation before they burn out reduces cost, assures better lighting and fewer work interruptions. Well documented with a case history. Westinghouse Lamp Div., Westinghouse Electric Corp.

Lighting for Critical Work Areas

Brochure illustrates the advantages of localized lighting designed to provide primary lighting on specific tasks, objects and confined areas. Illustrates typical lighting equipment for localized application and discusses flexibility to suit individual needs. Fostoria Corp.

Area Floodlighting 235

This 16-pager gives quick reference guides for selecting incandescent or mercury floodlights, general purpose or heavy duty types, and for determining how many floodlights are needed based on the size of the area to be lighted. Footcandle charts and installation diagrams are included, along with listings of floodlights and mounting accessories. Crouse-Hinds Co.

LP-Gas Floodlight

Data about a newly developed L-P gas floodlight that is weatherized, rugged in construction and completely portable, includes operating information, specifications and illustrations. Wm. W. Lee & Son.

Vaporproof Fixtures

Lighting fixtures for use in all indoor and outdoor locations exposed to moisture and rain, corrosive fumes, nonexplosive vapors and gases or non-combustible dusts are outlined in this catalog. The 28-page booklet contains complete technical data on vaporproof fixtures, flood lighting equipment, cast junction boxes and explosion proof xtures. Rab Electric Mfg. Co.

Corridor Lighting

Bulletin discusses two lighting units specially designed for hallways, corridors, and other aisle areas. Covers construction, easy maintenance and installation data. Edwin F. Guth Co.

Fluorescent Lighting Fixtures

Catalog contains complete data on specifications, dimensions, candlepower, and distribution of mercury vapor lighting for industry: geometrics for ceilings, troffers; and industrial fixtures designed for easy installation and maintenance. Great Northern Mfg. Co.

Adjustable Machine Lights

Bulletin presents data in favor of making machine lights independent of overall plant lighting. Illustrates six standard models, including specifications. Vimco Mfg. Co., Inc.

Fingertip Control Lamps

Brochure describes specially designed lamps for detailed work; discusses features of fingertip control and adaptability. Gives data on general purpose models, incandescent models, flair models and fluorescent models; combination and magnifying models. Luxo Lamp Corp.

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246

Close Work Lighting

243 Brochure catalogs and illustrates various lighting fixtures specially designed for small parts work, for printing presses, toolrooms, punch presses and screw machines. Includes general specifications. Stocker & Yale, Inc.

Emergency Lighting Units

Equipment for emergency lighting is cataloged in this 16-page illustrated booklet. Contains specifications and descriptions of storage battery type units, fixtures for remote mounting, automatic emergency lighting for elevators and other small areas, and explosion proof units for hazardous locations. Lightalarms Electronics Corp.

Easily Moved Lamp

Data about a lamp that fits on brackets mounted anywhere that additional light is needed. A series of installation photographs shows versatility in application. Moffatt Products, Inc.

Lighting Duct

This 36-page manual on lighting duct is generously illustrated with photos and drawings showing the types of lighting duct, suspension equipment, and methods of suspension as well as installation examples and use of essential fittings. The booklet also contains a section devoted to planning information such as recommended levels of illumination and a typical industrial layout. I-T-E Circuit Breaker Co., Bulldog Electric Products Div.

High Bay Lighting

247 Bulletin about adjustable fixtures for high ceiling lighting applications. Includes descriptions and illustrations of clamp and canopy models. A second bulletin gives data on a recessed adjustable unit. Swivelier Co., Inc.

Mercury Lighting Case Histories

248 Booklet contains two case histories of how mercury lamps helped solve industrial lighting problems in an automobile plant and in a large depot. General Electric Co., Lamp Div.

Fluorescent Starters

Data about a starter that is especially designed for use with the preheat-rapid start fluorescent lamp. Describes starter construction, features and illustrates test results that show thermal starting increases lamp life, and other advantages. Verd-A-Ray Corp.

Fold-away Utility Lamp

251 Data about a high intensity lamp designed for use where a single source of glare-free, concentrated light is desired. Includes specifications and recommended applications. Tensor Electric Development Co., Inc.

Fluorescent Lamp and Equipment Guide

This 20-page manual is a practical guide to fluorescent lamps and equipment, describing types of lamps and their operating circuits. A section is devoted to ballasts, starters and lampholders. Discusses operating characteristics, lamp life, lumen maintenance and end discoloration, voltage, coolness, and spectral distribution of radiation. Contains charts and illustrations. Westinghouse Electric Corp., Lamp Div.

Universal Lamp in Kit Form

254 Data about an incandescent-type utility lamp in kit form for use in laboratories, drafting rooms, assembly lines, inspection points and shop. Illustrates the do-ityourself assembly, and feature of flexibility. Zack Electronics.

Lighting Shields

The advantageous features of lighting shields made from Du Pont's new liquid chemical Monocite are discussed in detail in this booklet. Covers optical properties, long service life, light weight, easy maintenance and variety of sizes, shapes and textures. Includes application photos. Borne-Lite Corp.

Color Coded Luminaires

256 Booklet explains and illustrates the use of color coded luminaires in plants and factories to facilitate workers movements, eliminate hazards and help direct the flow of work. Outlines features of the luminaires, charts light curves and includes installation data. Edwin F. Guth Co.

Mercury Lamps

Profusely illustrated 27-page booklet is devoted to mercury lamps. Covers lamp construction, types, special features, performance, lumen maintenance, special characteristics, application information, special lamp types and their applications. Westinghouse Lamp Div., Westinghouse Electric Corp.

Lighting Equipment Catalog

Sectionalized catalog covers major areas of lighting including: outdoor fluorescent, floodlights, reflectors, and other types of lighting equipment. The catalog is well illustrated, includes complete technical information and photometric test reports. Steber Div., Pyle-National Co.

Incandescent and Fluorescent Lamps

Illustrated catalog gives data on general service and special purpose lamps; tubular and silver reflector lamps; low and high voltage lamps. Also covers incandescent and fluorescent lamps; fluorescent starters and renewable cartridge fuses. Solar Electric Corp.

Fluorescent Lamp Ballasts

Interesting manual describes how a ballast is manufactured, discusses types of ballasts including those designed for specific requirements. A section is devoted to operation under adverse conditions of heat, noise, polarity, line voltage, cold, humidity, and stroboscopic effect. Universal Mfg. Co.

252

Baldoitt Adjustable SPROCKET RIM

with Chain Guide

CHANGES THAT DANGER ZONE TO A SAFETY ZONE

... saves you money

ON EVERY VALVE

Every minute saved is money in your pocket. Cut out the waste of time, labor, floor space due to hard-to-reach walves. At the same time, convert Danger Zones to Safety Zones. Equip every overhead valve in your plant with Babbitt Adjustable Sprocket Rims with Chain Guides for day to day economy.

- They simplify pipe layout.
- They fit any size valve wheel.
- They are easy to install and operate.
- They operate any valve from the floor.
- They save time and money.
- The first cost is the only cost (no maintenance).
- They are packed completely assembled (one to a carton), with easy-to-follow instructions.
- A hot-galvanized rust proof chain is available for all sizes.

Babbitt Adjustable Sprocket Rims with Chain Guide are carried in stock by most mill supply houses. Just phone your mill supply salesman, or contact us direct.

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SAFET

STEAM SPECIALTY CO.

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REPUBLIC CLIP SHELVING

Republic Clip Shelving allows you to use every square inch of your valuable floor space. You can save time and money, too. Here is a complete shelving line, including shelves, parts, accessories and related shop items. Every piece is Bonderized. Republic Clip Shelving erects fast and easy. No tools are required. It can be rearranged to satisfy shelving needs as they arise. It is completely salvageable. The new Shelf Clip requires no stud or other special fasteners. The shelf snaps firmly into place.

et your Republic representative storage engineer your shelving roblem for you. Call him anytime.



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... tor more details, circle No. 48 on Reader Service Postcard

Quartz-lodine Lamps

262

General information about quartz-iodine lamps and the characteristics that make these lamps ideal for floodlighting large areas are covered in this bulletin. Charts data on 500 and 1500 watt models in narrow, medium and wide beam types. Includes photometric data. Steber Div., Pyle-National Co.

Floodlights

263

Booklet describes exclusive combination of features found in a new sealed-beam floodlight series. Includes listings of accessories, footcandle charts, dimensions, and lighting selector information. Crouse-Hinds Co.

Fluorescents

Tested Tips booklet includes a handy table that shows how few lighting fixtures are needed in different size rooms for lighting levels of 100 footcandles. Includes an illustrated report of how a company increased lighting level with rapid start fluorescents. General Electric Co., Lamp

Precision Lighting

ROUND

RECTANGULAR

265

Localized lighting equipment for industrial plants is presented in this booklet. Gives data on reflectors, sockets and fixture mounting bases. Discusses permanent flange or portable clamp mounting; condulet and floor flange mounting, horizontal swivel base and flexible gooseneck fixtures. Adjustable Fixture Co.

Incandescent, Mercury Vapor Lighting

Cover of this new catalog alphabetically lists sections for easy reference. Covers various types of reflectors, with illustrations and specifications of the many kinds available for every industrial need. Includes data on attachments. Smoot-Holman Co.

Fluorescent Lighting Ballasts

This 12-page guide lists fluorescent lighting ballasis for indoor and outdoor applications. Electrical and mechanical specifications for each ballast are included. Also contains wiring diagrams, data on operating voltage and frequency, and temperature specifications. Sola Electric

Emergency Lighting

Equipment for emergency lighting that operates independently of all other power sources is the subject of this bulletin. Includes installation and specification data on four models. Outlines features. Sentry-Lite & Battery Div., Hobby & Brown Electronic Corp.

Industrial Fluorescent Luminaire

269

Brochure about a new line of industrial lighting fixtures called Herculiner. Describes construction features, versatility of the shielded and unshielded units and advantages in appearance, rugged construction, improved shielding, easy maintenance and dependable operation. Westinghouse Electric Corp.

Structural Steel Tubing ... fast, reliable service



more strength at lower cost-Rigid box structures have demonstrated their economy in many applications. Weight and costs are less than many other common structural steels.

Smooth exterior surfaces — Provide handsome exposed structures without excessive expense required in costly

size range

from warehouse stocks—

Rounds from ¾6" diameter x .028
wall through 6" OD x .180" wall.

Squares from ¾8" x ¾8" outside x
.033" wall through 6" x 6" outside x .250" wall.

Rectangulars from 1" x ½" outside x .065" wall through 8" x 4" x .250" wall.

mill shipments

through 48" girth directly from one of the producing mills direct to the job site.

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Thousands in daily use



Adding a hoist or replacing a system? It will pay you to investigate the ElectroLift worm-drive unit first.

Extremely simple to operate, Electro-Lift hoists in 1/4 to 10-ton capacities feature enclosed worm gearing and motor for clean, quiet operation . . . long, troublefree operating life, thanks to quality components and materials...compactness for operation in close headroom . . . automatic or manual actuation . . . and safe, sure braking action.

For the model, speed and operation best suited to your needs, consult your classified directory for the nearest ElectroLift representative.



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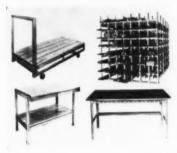
NEW EQUIPMENT

FOR WESTERN PLANT OPERATION, PRODUCTION AND MAINTENANCE

USE POSTCARD PAGE 76, For Information on Products Described

ERECTING KITS

users can assemble racks, carts, benches



New kits have extended the use of slotted angle framing material so that users can now assemble their own work benches, tables and carts as well as storage units and special purpose racks. Pre - cut lengths of angle are bolted together and

271

assembled into units. Kits provide all needed parts and assembly hardware. Line consists of 120 storage units, 82 storage racks, 17 work benches, 13 tables plus foreman's desk and 27 regular and heavy duty carts. One advantage of method is that when item becomes obsolete for plant requirements it can be reassembled into a new structure or cart to fit current needs. Acme Steel Co.

STRAP FEEDER

provides power strapping for limited packaging line. Feeder comes in three different models to fit various conveyor heights. When combined with power strapping tools, it provides power strapping features at moderate cost. Feeder consists of adjustable steel support frame, foot operated switch, 1/6 hp motor, strap chute system adjustable in one foot increments and a limit switch to automatically determine right amount of strap for each package. A device feature is the slipping clutch which permits smooth safely controlled feeding of strapping from dispenser through the machine. Stanley Works, Stanley Steel Strapping Div.

FIBER GLASS ROVING

is suitable for all types of spray gun use The new product has a special chrome-type binder that provides consistent performance. The gun roving in continuance strands is pulled into a fiber glass chopping device mounted with the spray nozzles and the chopped strands as they spray out of the cutter are comingled with pre-determined amounts of resin. The new gun roving is soft, static free and features fast wet out, since the product's softness factor traps resin without draining. It chops cleanly without clumping and readily conforms to intricate shapes and radii when laid down. Johns-Manville.

DIAL GAGE

274

. . . for high pressure applications

The new gage is expressly designed for pneumatic or hydraulic high pressure applications up to 10,000 lbs., and can provide accuracy of pressure measurement while withstanding excessive cycling. It has no moving parts, the pointer being connected directly to the pressure element, a helical wound Inconel X bourdon tube. As such the gage is virtually wearproof and tests have shown that its accuracy increases through continued use. The device is particularly suitable for applications in chemical processing petrochemical fields. American-Standard Controls Div.

STRAIN GAGE EPOXY

275

. . . sets in only three hours

A new fast setting epoxy cement has been developed. which is particularly suitable for use on strain gages. The cement sets in three hours at room temperature and with application of heat the setting time can be shortened to minutes. The product bridges the gap between 24 hour cements and one minute cements which set so rapidly a strain gage cannot be repositioned once it is applied. Also its use is not limited to smooth surfaces. Budd Co.. Instruments Div.

PARTS FEEDER

276

. standard unit has adjustable track, built in two sizes



A new small parts feeder has a divided feeding track that is adjustable in width and can be furnished for use with headed parts. It is made for operation with assembly and other equipment. Both sizes of feeders are designed compactly

yet have large hopper storage capacities. Tracks are straight for optimum part control and have neoprene vanes inside the drums to provide gentle parts handling. Feeders come either fully tooled for the job or with blank track ready to machine the part to be handled. Small feeder either is with air operated escapement or motor driven; larger one comes motor driven only. Dixon Automatic Tool, Inc.

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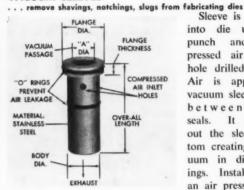
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Sleeve is installed into die under a punch and compressed air inlet hole drilled in die. Air is applied to vacuum sleeve ports between O-ring seals. It exhausts out the sleeve bottom creating a vacuum in die openings. Installation of an air pressure reg-

ulator on line saves air consumption and permits its supply to be intermittent. Air is thus provided just before punches hit the strip stock until they leave the die opening. Air-Vac Engineering Co.

URETHANE SEALS

278

resist wear, tear and abrasion Urethane hydraulic seals and packings are now made in the form of U-cups, O-rings, cup packings, rod wipers and washers. The new components have a high tensile strength of over 5000 psi at break and can withstand pressures of 3000 to 10,000 psi and higher with no back up rings. A design feature is a specially developed chamfered sealing lip that provides leak proof sealing, even at low pressures and allows easy assembly. The seals and packings can operate efficiently at temperatures from minus 40 to 225 degrees F. Disogrin Industries.

ROLLER CHAIN

redesign produces stronger chain

The new chain contains the same amount of material, but more perfectly distributed, which has increased actual breaking load about 58%. There are 40% fewer wearing surfaces, 39% greater bearing area and 66% more pin capacity. Result is chain requiring less adjustment and maintenance. Jeffrey Manufacturing Co.

LOCK NUT

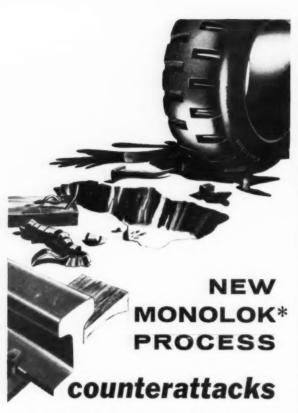
282

. . . provides positive locking despite vibration or shock



New lock nut is designed for applications where there is severe vibration or heavy shock loading. Its use provides positive locking and eliminates need for auxiliary locking devices such

as cotter pins, washers and double nuts. Nut is one piece, all metal, reusable torque type in which lock is developed by deflecting the top threads slightly out of their true helix. It starts freely until top threads are reached and then requires wrenching. Nut will lock on any position on any bolt provided 1 to 11/2 bolt threads protude beyond its top. MacLean-Fogg Lock Nut Co.



THE ENEMIES OF SOLID TIRES!

REDUCES MAINTENANCE AND REPLACEMENT COSTS!

Here's your secret weapon against those old enemies of solid rubber tires . . . loose metal scrap . . . brine and acid solutions . . . rough surfaces . . . overloaded conditions and excessive heat. Monarch tires with MONOLOK* process are chemically bonded to the rim and offer unmatched protection against rim separation . . . the most common cause of solid tire failure. Tough new compound T-5100 rubber gives Monarch tires excellent wear resistance . . . increases tire life . . . eliminates excessive maintenance and early replacement. Press the attack against high tire costs. Install Monarch MONOLOK* process tires without delay.

FOR ADDITIONAL DETAILS . . . please write direct and request Bulletin 457 B.

*MONOLOK... Monarch's revolutionary process that bonds rubber to metal permanently . . now available on all Monarch tires.

TOTHE-MER



SOLD THROUGH LEADING LIFT TRUCK DEALERS



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Western Warehouse Reno, Nevada

. . . for more details, circle No. 52 on Reader Service Postcard

has range from 25 to 225 amps

283

. . . roll-type feature provides versatility

A O Smith WELD IN CHARGE

This new industrial ac welder is designed to increase ability of small shops and maintenance departments to deal with difficult welding conditions. By increasing amps from 180 to 225 the new welder allows use of a greater variety of electrodes and can serve growing main tenance welding requirements of a modern plant. The new design accommodates

all low hydrogen iron powder electrodes and improves welding characteristics of large diameter rods. Greater amperage helps solve many shop welding emergencies typically complicated by hard-to-weld steels, out-of-position operation and dirty conditions. Also new in unit are thermostatic overload for complete machine protection, electrode selector and continuous current with a moving coil. A. O. Smith Corp.

TWO WAY RADIO

284

. . . has built-in ignition noise suppression

Device eliminates impulse interference from the radio equipped vehicle and other vehicles. Ignition noises are automatically detected in their early stages and device turns off mobile receiver for the 2-3 microsecond duration of each ignition impulse. Quieting the receiver does not affect the message clarity. Device is presently used on transistorized low band units. It is said to improve both range and reception and should be especially beneficial to users whose vehicles operate in heavy traffic areas. *Motorola, Inc.*

PRINTED CIRCUIT ADHESIVES

285

. . . four new types meet all circuit manufacture requirements



Since no one adhesive can meet material, production a n d bonding requirements of each m a n u f a c t u ring method, four have b e e n developed. Adhesives are of

liquid synthetic resin base thermosetting type. They bond copper foil to phenolic or epoxy impregnated base stock, phenolic paper, epoxy paper and epoxy glass materials. Each of the four have slightly different properties to comply with manufacturing needs. They are all applied, usually by a roller coater, to copper foil in a 1 to 2 mil dry film thickness. The coated foil is then air or oven dried, and bonded under heat and pressure to the base material. Minnesota Mining & Manufacturing Co., Adhesives, Coatings and Sealers Div.

This new air cleaner will operate efficiently in a variety of positions regardless of air flow direction. Media movement can be in either direction. The roll filter is available with automatic operation or manual drives and comes in 84 standard sizes. Farr Co.

CUSHIONED SKID

AIR FILTER

287

286

. . . isolates load shock from outside container

Device consists of a pad of cushioning material within the skid itself. This is said to eliminate need for cushioning heavy or bulky items within a large skidded container, and at the same time reducing expense for special padding and saving space. *Packaging & Converting Co. Inc.*

PLASTIC BIN

297

. . . features front rim for positive stacking

This plastic bin can be stacked without bowing or collapsing due to a front rim. It permits maximum storage in a minimum of floor space, and provides unusual flexibility in handling, storage and processing of small parts. Bins are lightweight, non-corrosive, waterproof and easy to clean. A molded card holder makes content identification easy. The plastic bins can be interstacked with comparable size steel ones. *Stackbin Corp*.

HEATING ELEMENT

298

. . for low temperature or spot heating applications

This compact glass heating element consists of a glass panel selectively coated with a metallic film, which forms an electrically-conductive path. The path permits a maximum amount of heat to be generated from a minimum size panel. The unit can produce temperatures in excess of 300 C with glass sizes from 1-in. to 27%-in. square and from 3/32 to ½-in. thick. The metallic film becomes essentially a part of the glass and normally will not rub, flake, peel or wear off. Corning Glass Works.

SMALL PART RETRIEVER

299

New instrument consists of ½-in. flexible coil shaft with spring plunger at top which operates four steel wire claws. Claws can be replaced with magnet. Device will work around corners and through small appertures to pick up nuts, bolts, screws, and small tools. Borroughs Tool & Equipment Corp.



. . provides reductions of up to 3600:1

By mounting a worm and gear at 90 degree angle to another reduction of up to 3600:1 has been attained. Together with enclosed housings, the double reduction speed reducer is available in a wide selection of ratios that range as low as 25:1. Units come in seven sizes and in torque ca-

pacities from 22,700 inch lbs. to 145,000 inch lbs. Primary and secondary reduction housings are parallel and the high speed housing is cooled by an aluminum or plastic fan of unique design. Large oil bath capacities and deep fins on both housings keep operating temperatures below a 100 degree rise above ambient. Eaton Manufacturing Co., Cleveland Worm & Gear Div.

CONTAINERS

289

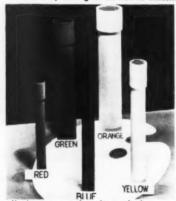
have heavy duty bottom for conveyor use

Vulcanized fibre conveyer receptacles are built with a new duplex bottom 1/2-in. thick which is riveted to the normal fibre bottom. Bottom consists of 5-ply vulcanized fibre and plywood base plate to withstand and at the same time provide a smoother ride on roller and skate wheel conveyers. Bottom is lighter than wooden types and because of vulcanized fibre's low friction and abrasion resistance, is less likely to snag. National Vulcanized Fibre

COLOR CODED CONDUIT

291

. . . for easy coding of conduit in industrial plants



This rigid steel conduit is available in all sizes and five colors, with elbows and couplings to match. Special colors are also obtainable. Conduit is of galvanized steel and is immersed in bath of acid resistant Poly-Vinyl to which color pigments are added. It is then baked hard. Product

eliminates on the site painting cost of estimated 7 cents per foot and is particularly advantageous when used in high bay areas, where painting is difficult. It is useful in providing long conduit runs in factories and in distinguishing from runs carrying electrical lines from those carrying telephone intercon or other lines. The color also provides a safety measure for warning of high voltage lines, being found increasingly in modern industrial plants. H. K. Porter Co., National Electric Div.

... has many industrial applications
A new line of synthetic rubber sealants under the name, Ad-Seal has been introduced. The adhesives are available in a non-sag type in gray, black, tan and aluminum and in a pourable type in gray, black and tan. These twopart compounds, when mixed, become thixotropic pastes which cure until they become firm, flexible synthetic rubbers which are not tacky. They are adhesives as well as sealants and are suitable for many applications such as metal windows, curtain walls, porcelainized metal panels and tilt-up panels. Adhesive Engineering.

BATTERY CHARGER

293

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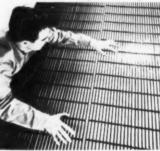
S

four circuit unit for charging lead-acid industrial batteries The new four circuit charger has but one motor generator to operate and maintain, making it easier to install and less expensive to operate than four single circuit units. Control is automatic for rate of charge, battery cut-off when completed and generator cut-off on completion or in case of power failure. Motor Generator Corp.

STEEL GRATING

294

. . . has closer mesh, greater strength



New grating retains high degree of visibility and ventilation and is easy to maintain, however the closer mesh increases load bearing capacity 60%. Mesh now uses 36 bars in each standard two foot width with clear opening

of ½-in. It is also available in 37 bars per two foot width with a 3/8-in. opening. Product will provide added durability in utility applications and for a wide variety of venting uses in other industries, including the building field where it is particularly suited for sidewalk openings. Blaw-Knox Co.

HANDLING TRUCK

295

will hold two 2000 lb. pallets

This rider type walkie truck is available of speeds up to 6.5 mph and can handle two 2000 lb. capacity pallets, each 48-in. long by 40-in. wide at one time. Due to fast speed and double load capacity the electric powered unit is well suited to such jobs as order picking. Lewis-Shepard Products, Inc.

VIBRATION FINISHING

296

new machines are fully automatic

A line of fully automatic continuous process vibratory finishers will provide high production precision finishing of metal, plastic or ceramic parts. Work is fed into and out of machine automatically and media are automatically cleaned, screened and recirculated. Compound and water are added automatically. Equipment also does cleaning. descaling, deburring, radiusing, grinding, fine-finishing. coloring and burnishing operations. Pangborn Corp.

Western NEWS

PLANTS - PRODUCTION - DISTRIBUTION - PERSONNEL

New Construction Plans For Alaska Telephone

ANCHORAGE—The Alaska Telephone Corp. has announced that it will, together with the British Columbia Telephone Co., construct a \$5,000,000 tropospheric scatter microwave system. The system, engineered and designed by Lenkurk Electric Co. of San Carlos, Calif., will become the main coastal communications bridge between Alaska and the continental states.

Both Alaska Telephone and British Columbia Telephone are subsidiaries of General Telephone and Electronics Corp. C. J. McLean, vice president of Alaska Telephone, said the FCC had approved the company's application to build and operate a complex terminal at Annette Island, which will interlock with the Ballistic Missile Early Warning System extending north.

The scatter system will carry up to 240 circuits, with about 120 to be installed initially.

AiResearch Expands Cryogenic Facility

LOS ANGELES — The Garrett Corp's AiResearch Manufacturing Co., here, has expanded its cryogenic laboratories with the construction of a new 1500 sq. ft. facility.

Flexible in operation, the new facility is capable of producing LOX converters, IR detector coolers, parametric amplifier diode coolers, back pack type suit coolers and pilot preflight cooling systems. In addition, a variety of other advanced thermal environmental and atmospheric refrigeration systems employing high vacuum insulated cryogenic storage containers can be manufactured in the new facility, according to *Richard A. Fischer*, senior project engineer.

AiResearch has been conducting research and development programs in the field of cryogenics since 1955.

Zitelli Wins Seventh Region I.R.E. Award



PALO ALTO, CALIF.—The 1961 Seventh Region I.R.E. Electronic Achievement Award has been conferred upon *Dr. Louis T. Zitelli* of Varian Associates for development of the VA-849 Klystron Amplifier.

Citing the tube as "a major breakthrough in the achievement of high power in the microwave range," the award committee said the tube delivered the highest known CW power at X-band.

The tube is described as delivering 20 kW CW at 7.125 to 8.500 Gc. Laboratory experiments on the same tube, slightly modified, have resulted in CW power output as high as 51.5 kW.

C. W. Carnahan, director of the Seventh Region I.R.E. said the award was "a fitting recognition for a truly remarkable achievement."

Dr. Zitelli joined Varian Associates in 1950, and since then has been engaged in theoretical and development work on high power pulsed and CW klystron amplifiers. Varian officials said much of his work has gone unrecognized because it involved classified government projects.

New Electronics Firm Opening in Hawaii

HONOLULU — Ling-Temco-Vought, a new electronics company here, is scheduled to go into operation beginning August 31. The firm is a merger of Ling-Temco Electronics and Chance Vought Corp., which stockholders of the companies voted June 30 in Dallas, Tex.

Executive committee chairman, James J. Ling, said the new firm will have about 20,000 employees and assets of \$194,000,000. The company will occupy new quarters at 680 Ala Moana Blvd., here, where it will operate as contractors for the Pacific Missile Range.

About 180 employees are already at work and this will be stepped up as the government moves ahead with its satellite, missile and man-in-space programs, according to William S. Micchelli, Pacific operations manager.

Annual sales of the company are anticipated in the \$400,000,000 bracket, most of this in the manufacture and sales of aerospace equipment. The rest will be in civilian fields, including high fidelity equipment, loudspeakers, communications equipment, kitchen appliances, refrigeration systems and educational and commercial television and radio.

Cerro Corp. Options on Aluminum Smelter Site

PORTLAND—The Cerro Corp. has taken an option on a possible site for a primary aluminum reduction plant on the lower Columbia River, according to Richard H. Lewin, Cerro vice president.

In an agreement with the Wauna Lumber Co., owner of the property, Cerro has optioned 1030 acres of land with deep water facilities at Wauna, 42 miles upstream from the mouth of the Columbia River.

Cerro is a producer and fabricator of nonferrous metals.

Goodrich Using Air Buildings for Warehousing Tires



LOS ANGELES—A new type of warehouse construction that lowers storage costs is being employed here by the B. F. Goodrich Co.

Two "air houses" believed to be the first to go into service in the Western states as multiple units are standing side by side on a former carparking area leased by B. F. Goodrich in the central manufacturing district. They provide warehouse space for 60,000 passenger tires.

Each structure, containing 226,195 cu. ft. and measuring 180 ft. long, 60 ft. wide and 30 ft. high, is shaped like a quonset hut with round ends. Both units were erected and ready for service in only two days.

A 3-hp electric motor with 30-inch fan runs 24 hours a day to keep each air structure rigidly inflated at one-half pound of pressure per square foot. In case of an electric power failure, an auxiliary gasoline engine is activated to maintain the same air pressure.

The air house warehouse idea, first initiated for Goodrich by S. I. Warner, manager of sales-service for B. F. Goodrich Tire Co., is solving one of the tire industry's big problems. While tire inventories are being accumulated to meet seasonal retail sales peaks, low cost warehouse space is needed.

C. B. Zink, master warehouse manager in Los Angeles, said tire inventories in the two air-inflated buildings are expected to "turn," be moved and



This bundle of Geon-coated nylon fabric, when inflated, as shown, forms a warehouse space totaling 20,054 sq. ft. Tony Nagin, left, vice president of CID Air Structures Co., discusses construction methods with R. R. Young, center, Pacific region architect for B. F. Goodrich Tire Co.; and C. B. Zink, Los Angeles master warehouse manager for the tire firm, B. F. Goodrich is using two air houses to warehouse tires in Los Angeles.

replaced, about four times a year. Tire warehousing costs after the first year will be about 80 percent lower than the leasing of space in permanent buildings. The air houses can be deflated, moved to a new location or rolled into a small bundle for storage in only a few hours.

Structural Steel & Forge to Open Service Facility

ROCK SPRINGS, WYO. — Structural Steel & Forge Co., Salt Lake City, Utah, has announced establishment of a steel service center here with the building to be completed by mid-July, according to Norman Rosenblatt, structural sales manager

PG&E Plans Atom Power Plant for Bodega Bay

BODEGA BAY, CALIF.—Plans for one of the largest atomic power plants in the world were announced recently by Pacific Gas & Electric Co. President Norman R. Sutherland at the site of the proposed project 50 miles north of San Francisco on Bodega Bay.

Sutherland said applications to the U. S. Atomic Energy Commission and the California Public Utilities Commission for permission to build the plant would be made as soon as possible.

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The Bodega Bay atomic installation will have an electric generating capacity of 325,000 kilowatts, powered by a boiling water reactor. That capacity is enough to serve a city of half a million population.

The power company estimates the station will cost \$61,000,000, and will produce electricity for slightly less than six mills per kilowatt hour. It is scheduled for completion late in 1965, Sutherland said.

PG&E believes electricity produced at Bodega Bay with nuclear fuel will be economically competitive with electricity that could be generated in a conventional steam plant (gas and oil fueled) at that location. A North Bay site was selected because PG&E will require a large generating station in that region in 1966.

Sutherland pointed out that no economically competitive atomic power plant is operating in the U. S., but PG&E's 60,000-kilowatt Humboldt Bay Nuclear Unit, under construction near Eureka, Calif., is expected to produce electricity competitive in that area.

If necessary licenses and permits are obtained on schedule, PG&E will start work at Bodega Bay in August 1962. An estimated 300 men will be at work on the project at the peak of construction activity. PG&E will function as its own engineer and construction manager.

Carpenter Steel Acquires El Cajon Tubing Company

EL CAJON, CALIF. — The Carpenter Steel Co., with headquarters in Reading, Pa., has announced the acquisition of Nth Products, Inc., here, makers of thin wall tubing.

The acquired company, which will be operated as a wholly owned subsidiary, has sales exceeding \$1,000,000 annually.

Union Oil Purchases American Liquid Gas

LOS ANGELES—Union Oil Co. of California has purchased the American Liquid Gas Corp., it was announced recently by *Reese H. Taylor*, Union's chairman of the board. Purchase price was not disclosed.

American, with headquarters in Los Angeles, has been a pioneer in both the distribution of liquefied petroleum gas and in liquefied petroleum gas engineering, construction and manufacturing. Union has organized two new subsidiary corporations and will divide American's operations between them, Algas Fuel Supply Co. and American Liquid Gas Engineering and Equipment Co.

"This acquisition," said Taylor, "is pursuant to our policy of diversifying into fields complementary to Union's present operations. Purchase of American Liquid Gas Corp. will allow Union to more fully participate in the increasing use of liquefied petroleum gas, the fastest growing segment of the petroleum industry."

Algas Fuel Supply Co. will continue the wholesale and retail distribution of liquefied petroleum gas conducted by American's Algas division through plants in Los Angeles, Fresno, Santa Barbara, Oxnard, Merced, Modesto, Pomona, Ventura, Buellton and Big Bear. William C. Ulett will serve as president.

American Liquid Gas Equipment and Engineering Co. will continue the manufacture and international distribution of American's line of carburetion and plant equipment. *Harold W. Smith*, founder of American Liquid Gas Corp., and its president for 25 years, will serve as president of this new subsidiary of Union.

North American Building Nevada Research Facility

RENO, NEV. — A new advanced solid propellant research facility in the Warm Springs Valley area, 18 miles northeast of Sparks, will be constructed by North American Aviation, Inc., according to J. S. Smithson, senior vice president-administration.

The facility will be operated by NA's Rocketdyne division. To be built are mixing, curing and casting buildings, storage buildings, a machine shop, test and motor preparation building and an administration building. Land and buildings are estimated to cost \$300,000.

New Land-Air Division Plant in Operation

SAN LEANDRO, CALIF.—The Instrument and Electronic Div. of Land-Air, Inc. has begun production in new 65,000 sq. ft. facilities at 449 Hester St., here, according to *B. P. Moore*, sales manager.

The plant produces precision sheet metal products for the electronics industry; electrical and electronic cabling; electronic test and checkout equipment; nuclear instrumentation and devices. Georgia-Pacific, Allied Chemical in Joint Study

PORTLAND — The Georgia-Pacific Corp. and Allied Chemical Corp. have announced an agreement to explore jointly the commercial development of certain processes patented by Georgia-Pacific for manufacturing chemicals from wood.

The processes, which have been tested in a pilot plant here, produce a variety of chemical products from bark and wood fiber normally considered as waste.

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. . . for more details, circle No. 57

Borden Chemical's New Research and Development Lab



Borden Chemical Co. recently completed this new laboratory at Springfield, Ore. where research will be carried on in the area of adhesive development for the plywood, particleboard, hard-board, timber laminating, and furniture industries. The lab will also conduct studies on process development, and incorporates pilot planting equipment for this purpose.

Universal Marion Buys Quick-Way Truck Shovel

DENVER—Purchase of the Quick-Way Truck Shovel Co., E. 40th Ave. and Josephine St., by Universal Marion Corp., Jacksonville, Fla., will result in expansion of the operations here and afford a wider market for its products, Quick-Way officials said recently.

Universal Marion purchased Quick-Way from H & B American Corp., Los Angeles, and Fairbanks Whitney Corp., New York.

The two firms had operated Quick-Way as a joint venture since July 1958.

Gilbert S. Rigdon, chief operating officer for Quick-Way, remains as head of the Denver operation as vice president of the new division of Universal Marion.

The plant currently is engaged in filling several defense contracts and has a normal work force of some 250.

Cascade Fiber Company Acquires 40-acre Site

EUGENE, ORE.—Eliot Jenkins, president of the recently formed Cascade Fiber Co., has announced purchase of a 40-acre site in the Danebo district northwest of Eugene for the company's proposed \$1,000,000 wood composition board plant.

Construction of the plant is expected to start this summer, and the facility should be in operation early in 1962, Jenkins said. Present offices are located at 50 N. Danebo Ave., here.

Nor-West Fabrics Plant Underway at McMinnville

MCMINNVILLE, ORE. — Construction has begun on a new \$305,000 woolen mill here which is scheduled to be in operation before fall with a \$500,000 payroll.

Immediate start on the project was made possible when W. W. Windle, Millbury, Mass. industrialist and backer of the woolen mill, provided \$250,000 interim financing to McMinnville Industrial Promotions, Inc., for the building.

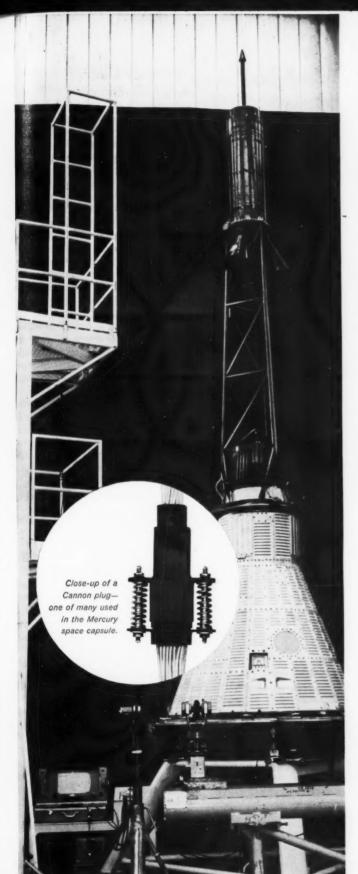
Nor-West Fabrics, Inc., founded to succeed Portland Woolen Mills, will be the only operation of its kind supplying the general trade in the West. The 67,000 sq. ft. building project is located on a 6½-acre tract on Lafayette Ave. in northwest Mc-Minnville.

New Denver Distribution Center for U. S. Plywood

DENVER—Formal opening of the new \$750,000 distribution center of U. S. Plywood Corp. at 490 Osage St., east of the Valley Highway, took place recently.

Here for the ceremonies were vice presidents *Jerry Kayne*, in charge of branch administration, and *John Schlick*, financial director, both of New York City, and *Fred B. Smales*, Western regional vice president, Los Angeles.

Norman D. Ward, Denver branch manager, was host to 300 area industrial leaders, builders and architects at the new plant.



Another Example of Modern Gas technology

Gas-fired furnace gives AOK treatment to space capsule "plugs"

The success of Project Mercury was a success for modern gas technology as well. Many electrical connectors aboard the Mercury space capsule were die cast from metal prepared in gas-fired furnaces at Cannon Electric Company in Los Angeles and Santa Ana.

Why gas? Efficiency and Economy. Officials at Cannon report that gas furnaces reach high temperatures quickly and maintain them easily. The result is low metal porosity—and fewer rejects of finished connectors. Initial investment in a gas furnace is lower, too. And gas costs less than any other fuel.

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America's Mercury space capsule prior to its history-making flight into outer space.

Standard Steel Builds Dryer for Plastics Industry



Spherical particles of Polystyrene will be dried in this new rotary dryer manufactured by Standard Steel Corp., Los Angeles. Dryer uses steam heated air for drying and is made from 20% clad 304 stainless steel. Rotary processing equipment of similar types is made for the chemical, mining and food processing industries.

Harvill to Occupy Two New Compton Facilities

LOS ANGELES—Harvill Corp.'s three divisions and subsidiary will be moved to two new Compton, Calif., plants during the next three months, the company announced.

The moves, formerly scheduled for completion in August, have been delayed by architectural and engineering changes, the announcement said.

Harvill's total production area will be increased from 95,000 sq. ft. to 141,000 sq. ft. as a result of the moves.

Femco aircraft hinge division next month will be transferred from Redondo Beach into its \$300,000 plant of 30,000 sq. ft.

In October, the die casting and special products divisions and American Aerophysics Corp., a molded plastics producer, will move into a \$1,-300,000 corporate headquarters facility of 101,000 sq. ft.

These operations are now housed in plants at 6251 W. Century Blvd. and at 6824 Brynhurst St., Los Angeles.

Harvill has optioned another nine acres, sandwiched between Femco's two-acre site and the headquarters facility's eight-acre site, for potential future needs.

Vapor Recovery Systems Newly Named VAREC, Inc.

LOS ANGELES—The corporate name of Vapor Recovery Systems Co. has been changed to VAREC, Inc., according to Ray V. Long, president.

Since its founding in 1928, the firm's operations have expanded into many new fields so that the former name did not properly describe the company or its activities, Long said.

VAREC, Inc. has been adopted as the new corporate name because the trademark is well-known and offers a title for expansion into new operations in the future.

Costello Builds Record Sized Pipe Bending Unit

HUNTINGTON PARK, CALIF.—Costello Engineering Corp. has joined with L & F Machine Co. to produce what is believed to be the largest rotary pipe bending machine in the United States.

Weighing 70 tons and designated the Costello Model 14-MR1, it will be delivered to Puget Sound Naval Shipyard, Bremerton, Wash.

Maximum bending capacity is rated at 14-in. OD on pipe having a wall thickness of ½-in. Except for size the machine is similar to other models of the Costello MR1 series now in

Chemical Contour Acquires Empcor

GARDENA, CALIF.—Chemical Contour Corp. has acquired all the oustanding stock of Empcor, a Burbank, Calif., manufacturer of etched circuit boards for the electronics industry.

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James H. Langworthy, president of Chemical Contour, who made the announcement, said that Empcor would continue to operate as a separate entity. Empcor has 15,000 sq. ft. of manufacturing and engineering space in its Burbank plant. Langworthy said he expects Empcor's sales to approximate \$500,000 over the next 12 months, based on the firm's present activities.

The Chemical Contour president said his company was particularly interested in the possibilities of combining chemical milling and etched circuitry processes for the development of new products and techniques.

Tracy T. Day, formerly division manager of the West Coast Division of Altamill, metal fabricating and chemical milling firm, has been elected a vice president of Empcor and will be general manager.

Chemical Contour, of Gardena, is in the field of chemical milling, a process for fabricating metal parts through the chemical removal of metal rather than with machine tools.

McCulloch Corp. Building Center Near LA Airport

LOS ANGELES — A new 12-story office building and restaurant complex will be erected adjacent to the new "jet-age" terminal at Los Angeles International Airport, it has been announced by Robert P. McCulloch, Sr., president of McCulloch Corp. McCulloch manufactures gasoline-powered chain saws, outboard motors, karts and kart engines.

Construction of the modern new office center will get under way about November 1 on an 8½-acre site near the airport.

"Being across the street from Los Angeles' new jet airport puts the Center no more than a few hours away from any major city in the United States or the world," McCulloch pointed out. "We plan to locate our own world headquarters here for this reason, and will eventually consolidate our other world-wide offices so that they are near airports," the industrialist added.

Continental to Expand LA Maintenance Base

DENVER—Continental Airlines will expand the capacity of its Golden Jet Maintenance Base at Los Angles International Airport by 50 per cent to take care of the company's four new Boeing 720B fan-jet airplanes being delivered next spring, according to President Robert F. Six.

The \$1,000,000 expansion, which will be completed next March, will make possible work on three Golden Jets simultaneously compared to the present maximum of two planes, Six said, and will raise the company's investment in the base to \$4,000,000.

Six also said the company is building a \$250,000 flight kitchen in Los Angeles with a capacity of 5,000 meals a day to supplement Continental kitchens in Chicago and Denver.

Work on both the base and the kitchen is being handled by Quinton Engineers Ltd. of Los Angeles.

Continental's expanded activities at Los Angeles next year will add approximately 250 employees to the company's local work force, boosting it to 1,000 employees with an annual payroll of \$7,000,000.

Astro-Science Acquires Ground Support Division

LOS ANGELES — Astro-Science Corp. has completed acquisition of the Ground Support Div. of American Electronics, Inc., and appointed Alan F. Thompson president of the new subsidiary, which will be known as American Astro-Systems, Inc. The announcement was made by George Otis II, board chairman, and Peter H. Stanton, president of the parent company.

The acquisition adds approximately \$8,000,000 a year in sales volume to Astro-Science's operations. Purchase price was reported to be well in excess of \$1,000,000 in cash. Located in El Monte, Calif., American Astro-Systems has 180,000 sq. ft. of plant space.

Otis will assume additional responsibilities as board chairman and chief executive officer of the new division. Thompson becomes president. Both are newly created positions.

Other Astro-Science divisions include American Concertone, Inc., pioneer tape recorder manufacturer, and American Avionics, Inc., military electronics producer.

Telecomputing Consolidates Manufacturing Operations

LOS ANGELES—In a series of moves, Telecomputing Corp. has opened new corporate offices at 9229 Sunset Blvd., here, established an advanced controls systems and components engineering facility, and consolidated the manufacturing operations of two divisions, according to Wm. R. Whittaker, president.

Part of a permanent master plan to increase its guidance and controls capabilities, removal of Telecomputing's corporate offices from 915 No. Citrus

Ave. has enabled its Whittaker Controls Div. to utilize these facilities for combined production, engineering, marketing and personnel management. Manufacturing and assembly has been moved from Lynwood to Van Nuys, Calif., where it will operate in concert with the Whittaker Gyro Div.

Whittaker Controls aerospace engineering group has been set up in a newly built 28,800 sq. ft. building in Chatsworth, Calif. This group will design and build prototypes of advanced systems and components for the jet and space age.

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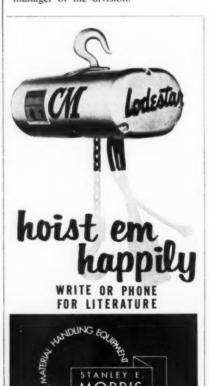
New Expanded Facilities for Alpha Pacific Div.

Los ANGELES — Alpha Wire Corp. has expanded its Pacific Div. to the status of a complete factory warehouse and sales operation, serving the 13 Western states.

In line with this expansion Alpha has moved its facilities to a larger building located at 11844 Mississippi Ave., here. The new building encompasses more than 12,000 sq. ft. and has complete warehouse facilities, enabling it to deliver from stock the more than 6,000 wire and cable products in the Alpha line, as well as tubing and lacing cord products.

The new Pacific Div. factory has also installed special equipment to enable it to perform short-run services which include striping, braiding, cutting and stripping, cabling and shielding, of both vinyl and teflon insulated wires.

Alpha sales on the West Coast increased 52% since the inception of the Pacific Div. at the end of 1959, and another 50% is expected this year, according to *Donald Rappaport*, manager of the division.



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Plant Protection Firm Announces New Merger



Ralph E. Davis, left, president of General Plant Protection Corp. greets William H. Young, now in charge of the firm's San Jose, Calif. and Honolulu plant protection activities. The firm patrols over 375 industrial and manufacturing plants.

LOS ANGELES—General Plant Protection Co. has announced its merger with the guard and patrol divisions of the William H. Young Co. of San Jose, Calif. and Honolulu. Announcement was made jointly by Ralph E. Davis, president, and Clarence W. Bracy, executive vice president.

To be known as Young Patrol Div. General Plant Protection, acquisition of the new facilities increases the number of Western manufacturing and industrial plants now served by the firm to 380. One of the firms recently added to this list was Lockheed Air Service. Honolulu.

Vard Forms Aerospace and Nuclear Divisions

PASADENA, CALIF. — In a move reflecting the growing diversification of its operations, the Vard Div. of Royal Industries, Inc., here, has established two sales divisions; one for Nuclear and the other for Aerospace, according to B. G. Tubbs, Vard president.

Named to head the Nuclear Sales Div. is *Alex J. Aronson*, who has been with Vard since 1958.

Robert A. Almquist has been appointed Aerospace sales manager.

Vard manufactures control rod drives and other precision mechanisms for military, commercial and research atomic reactors. In the aerospace field, it produces components for military and commercial aircraft, gear assemblies for helicopters and ground support equipment for missiles.

Datex Corp. Building Additional Facilities

MONROVIA, CALIF.—Plans for the immediate construction of the first unit of a new 48,000 sq. ft. building were announced recently by Datex Corp. president, Carl P. Spaulding.

Erection of additional facilities was made necessary by the continued growth of the company, Spaulding said. The firm had 97 employees on the payroll in May 1958, when the former Giannini Division was organized as a separate corporation, and 256 employees in May 1961. Datex, a subsidiary of Giannini Controls digital data systems. It has its main plant and offices at South Myrtle Ave., here, about six blocks north of the site of the new plant.

The new building, with a parking area for 140 cars, will occupy almost an entire block. It will be one-story, of tilt-up construction, and completely air conditioned. The first unit will have a floor space of 18,000 sq. ft. of which 1,000 sq. ft. will be for offices and laboratories and 8,000 for some mechanical assembly operations now crowded in the existing building.

Dresser Mfg. Opens New Los Angeles Warehouse

LOS ANGELES—J. E. Fendrick, West Coast warehouse manager at San Francisco, of Dresser Industries, Inc., has announced the opening of a new warehouse at 3409 Medford St., Los Angeles.

The new 5,000 sq. ft. warehouse will stock pipe couplings and repair products for the gas, water, sewage and oil industries in Southern California and Arizona, according to *James M. Hughes*, sales manager.

Warren Heath has been transferred from the South San Francisco warehouse to manage the new Los Angeles facility.

The Division has manufacturing headquarters at Bradford, Pa.

Atchley Names Airsupply As Sales Representative

LOS ANGELES—Raymond Atchley, Division of American Brake Shoe Co., Los Angeles firm specializing in design and manufacture of servovalves and control systems, and other electromechanical components, has announced the appointment of Airsupply-Aero Engineering Co. as representatives for Atchley products.

Airsupply is a division of Garrett Corp.

Foxboro Co. to Acquire Waugh Engineering Firm

VAN NUYS, CALIF. — The Foxboro Co., Foxboro, Mass., has announced plans to acquire the assets of Waugh Engineering Co., here, manufacturers of electro-mechanical and electronic instruments, in exchange for 12,806 shares of its common stock.

Waugh, to be operated as a division of the Foxboro Co., will continue under the direction of its founder, Charles C. Waugh.

In announcing the signing of a purchase agreement, R. A. Bristol, Foxboro executive vice president, emphasized that Waugh products, particularly its turbine flow meters, are an important addition to the extensive Foxboro line of measuring and controlling instruments for the process industries.

The new Waugh division provides a second manufacturing facility for Foxboro on the West Coast. Additional Foxboro establishments include a branch factory at San Leandro and sales offices at Alhambra, Calif., Seattle, and Portland.

Dashew Business Acquires Automated Sensory Devices

LOS ANGELES — Dashew Business Machines, Inc., here, has announced the acquisition of Automated Sensory Devices, manufacturers of punched card, paper tape, and edge punch readers, and other electronic devices.

Now known as the Electronic Datacoupler, Inc., the firm will be operated as a wholly owned subsidiary of Dashew Business Machines, Inc. Guy E. Morrison as president.

John H. Humphrey, executive vice president of Dashew, in commenting on the acquisition said, "The Electronic Datacoupler, Inc. will sell many of its products directly to other equipment manufacturers, such as manufacturers of general purpose and process control computers, accounting machines and manufacturers of control systems for automating machine tools."

In addition to the Electronic Datacouplers, Inc. own sales staff, certain machines made by Electronic Datacouplers, Inc. will be coupled to present Dashew machines.

Riverside Cement Orders Giant Dust Filter



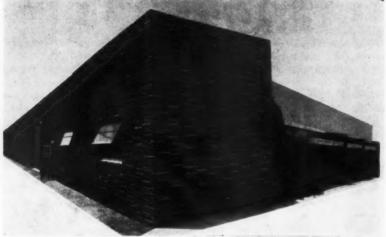
ORO GRANDE, CALIF.—A large Thermo Flex high temperature glass bag filter type dust collector has been ordered by the Riverside Cement Co. and will be installed at their Oro Grande, Calif. plant.

Designed to clean kiln gasses, the filter system will use over 240,000 sq. ft. of glass cloth. Bags will be housed

in a five building complex featuring pre-cast concrete shells, internal partitions and supports.

The Oro Grande installation is being made by Western Precipitation Div., Joy Manufacturing Co. and is the largest ever planned. It is the ninth such installation made by the firm in the cement industry.

Perfect Gear Combines Facilities in New Factory



Administrative and sales offices have been combined with manufacturing and test facilities at Perfect Gear and Instrument Corp.'s new 20,000 sq. ft. building at 339 South Isis, Inglewood, Calif. The test laboratory is centrally located to permit quality control checks throughout processing. A subsidiary of Liberty Electronics Corp., the company makes precision gears, instruments, magnetic clutches and related components.

Hollywood Firm to Handle Beryllium Oxide Ceramics

HOLLYWOOD, CALIF.—Heim & Scheer, Inc., 3360 Barham Blvd., here, has been named technical sales representatives for National Beryllia Corp. in Southern California. The firm will handle National Beryllia's line of beryllium oxide ceramic standard products and specially-engineered shapes.

Beryllium oxide forms a unique high-temperature ceramic which has high electrical resistivity but which conducts heat like a metal. Applications include microwave windows, electronic tube envelopes, heat sinks, micro-module wafers, thermocouple insulation, and laboratory ware.

Measurements Spectrum, Inc. New Instrument Repair Firm

ALHAMBRA, CALIF. — A new company, Measurements Spectrum, Inc., has established a 6,000 sq. ft. facility here for the certification, calibration and repair of electronic instruments.

Included in the new plant, according to C. E. Otterman, president, is a standards laboratory which will issue certifications traceable to the National Bureau of Standards.

The facility operates radio-equipped carriers to speed pickup and delivery, and provide safe handling of sensitive instruments. Similar facilities are planned for two other California areas.

Francis Economy Boilers New Meridian Subsidiary

BELLFLOWER, CALIF. — Francis Economy Boilers, Inc., with plant and offices at 9140 East Rose Ave., here, is now a wholly-owned subsidiary of Meridian Systems, Inc., according to C. M. Hollis, Jr., president of Meridian, who will also serve as Francis General Manager. "The new corporate setup will afford improved production facilities and an accelerated sales program," Hollis stated.

L. R. Jones will serve as vicepresident and general sales manager. He will be assisted by Paul F. Wandrey and Tom W. Watson.

Francis boilers and water heaters will continue to be marketed through leading equipment distributors selling to the industry nationally and regionally, according to Jones.

New Phoenix Facility for Cortez Chemicals

PHOENIX — The Cortez Chemicals Co. has moved into a newly completed 4,000 sq. ft. office and laboratory building at 734 E. Southern Pacific Dr., according to Seymour Thomas, general manager.

Cortez, a division of Arizona Fertilizer and Chemical Co., has research and development facilities to handle the needs of industrial and agricultural manufacturing.

In the industrial field, Cortez produces cleaners for manufacturing and maintenance.

Automatic Power Plants Predicted by Engineers

LOS ANGELES — Electric power plants of the near future will rely completely on automatic control, with significant savings to utilities, it was predicted here recently by J. K. Dillard, manager of electric utility engineering for the Westinghouse Electric Corp. and J. L. Everett, director of research for the Philadelphia Electric Co.

In a paper presented to a meeting of the American Society of Mechanical Engineers, the co-authors reached this conclusion on steam power plant automation:

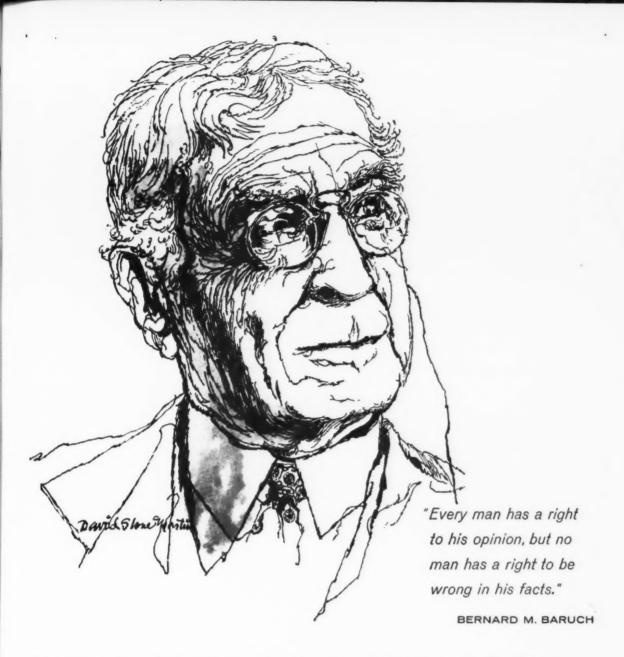
"While heat rate and reliability improvement are certainly factors in justifying automation, the real economic justification lies in two places. One is in the elimination of manual control apparatus. The other is in the reduction of the cost of generation apparatus when it is designed for strictly automatic operation. This implies that the power plant of the future will have provision for automatic control and rely on it completely. The resulting savings should be significant."

The authors offered several economic incentives for automatic control, noting that the most important are increased reliability, improved operating efficiency, and more productive use of manpower. It was pointed out, however, that behind each economic incentive has been the growing complexity of steam power apparatus and its operation.

"This complexity has made it increasingly imperative to replace the judgment of the human operator with automatic equipment. Because human operators cannot react fast enough to hold transients within design limits, analog devices increase reliability. These devices also improve operating efficiency by holding plant variables near optimum values," they reported.

The writers said that both sequential control, in which human operators now start and stop plants and deal with emergencies, and dynamic control, which involves such variables as temperature and pressure can be automated by a central high-speed, solid-state digital computer.

Six computer control power stations are now under contract in the electric utility industry, according to the report.



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Construction Underway on Phoenix Candy Plant

PHOENIX — Construction began last month on a \$1,000,000 candy manufacturing plant, according to *Nathan Cohen*, onetime "Marshmallow King" of the United States.

Cohen said his company, which is still unnamed, will be housed in a 20,000 sq. ft. building to be constructed in the 2300 block on N. 23rd Ave.

Initially the concern will produce bulk and packaged hard candies for wholesale distribution throughout the Southwest, Cohen said.

Operations are scheduled to begin in September, with a staff of 100 employees working two eight-hour shifts. The plant will cost in excess of \$250,000. Machinery and equipment will run about \$700,000, according to Cohen.

Cohu Electronics Reports Income Up 27¢ a Share

SAN DIEGO, CALIF.—Cohu Electronics, Inc., has reported six months' net income of \$638,341, before federal income taxes, compared to \$13,632, for the first six months of 1960, and \$404,341, net income after taxes, or 28 cents a share compared to 1 cent a share for the first six months of 1960.

LaMotte T. Cohu, board chairman, said the six months' sales were \$5,-417,204, up 69% over the first six months of 1960 sales of \$3,211,945.

Sales for the second quarter of 1961 amounted to \$3,315,697, resulting in net income before federal income taxes of \$407,186, compared to 1960 second quarter sales of \$1,719,658, and net income before federal income taxes of \$8,534.

New Computerized Device Rapid Engineering Aid



Engineers at T. Y. Lin and Assoc. prepare to transmit data from the automatic typewriter, left, to Computermat some 20 miles distant. Autofax, right, relays the data over regular telephone lines at standard long distance rates.

LOS ANGELES—Computermat Inc., a recently organized computer service center, and T. Y. Lin and Assoc., an engineering firm, have utilized a new communications device called Autofax to transmit input data and to receive the answer by telephone.

The system, developed by Communications Control Corp., permits information from punched paper tape to be relayed to and from a computer system located anywhere there is telephone service.

This is how the system works. An engineer dials the Computermat number and describes a problem to be computed on the firm's IBM 1620 system. He feeds a pre-punched tape into an automatic typewriter in his office and the Autofax in the Computermat office punches a duplicate tape on their typewriter.

The tape is fed to the computer and the results are tabulated. A repeat of the typewriter operation is made and the answer received by the engineer.

Dyna-Therm Chemical Forms Products Div.

CULVER CITY, CALIF. — Dyna-Therm Chemical Corp., here, has established a new division to promote commercial sales of high temperature coatings and insulating materials originally developed for military applications, according to George M. Joyce, company president.

Named to head the new Industrial Products Div. is Ernest R. Stern, who has served for the past two years as manager of Dyna-Therm's Thermal Div.

In addition to products already proven successful in missile tests, the new division will market a line of specialty items, Joyce stated. These include heat resistant papers, coatings and prefabricated parts; urethane potting compounds; lightweight interior partitions; curtainwall materials and corrosive-resistant marine and industrial coatings.

Dyna-Therm Chemical Corp. manufactures high temperature and insulated coatings, plastics, specialty building materials and a complete line of consumer, contractor and industrial paints.

New Research Division for Zero Manufacturing

BURBANK, CALIF. — The formation of Zero Research Laboratories as an operating division of Zero Manufacturing Co. was announced recently by president John B. Gilbert.

Gilbert said the new division already has several classified projects in research, development and furnishing prototypes for the Hawk, Minuteman and Sidewinder missile programs. Zero Research Laboratories was formed to provide R&D and production for all types of metal joining, welding and epoxy bonding. This will include the rare earth metals such as columbium, zinconium, hafnium and others. Gilbert said that metal bonding using epoxies is still in its infancy but that through advanced research, more and better applications will be discovered.

According to Gilbert, the new division is the only operation of its kind west of Chicago to be completely equipped to offer services of this type. He announced that *Kenneth Bence* will be general manager of the new division. Bence was formerly with Sciaky Research Laboratories and Electronic Welding Co.

Orbitronics Acquires Monogram's Equipment

LOS ANGELES — Purchase of special machine tools, inventory for production of rocket equipment, parts-in-process inventory and current orders from Monogram Precision Industries Inc. of Culver City, Calif., has been announced by American Orbitronics Corp.

According to Richard Candelaria, president of the purchasing firm, all equipment has been transferred to American Orbitronics' new 30,000-sq. ft. plant in nearby Hawthorne, Calif.

American Orbitronics manufactures turbines rotary wheels, nozzles, stators, jetevators and related missile components fabricated from exotic metals for use in solid and liquid propellant systems. It also produces gimbal housing assemblies for rocket guidance and other purposes.

Logistics Services Opens Expanded Processing Plant

van Nuys, calif.—Logistics Services, an operation of Noble Jones & Associates has opened expanded processing facilities at 6100 Sepulveda Blvd., Van Nuys.

The additional 10,000 sq. ft. of processing buildings and 100,000 sq. ft. of staging area are located at the intersection of the Los Angeles, San Diego-Ventura freeways and the Santa Fe railroad.

The firm specializes in preparation of industrial and military material for shipment or storage. The group specializes in packaging engineering, container design and manufacture and distribution planning. Allied facilities are maintained in East Los Angeles and the International Airport area.

New Electronic Component Manufacturer in Pasadena

SOUTH PASADENA, CALIF. — Electro Cube, Inc., a new electronic components manufacturer, was formed here recently with facilities at 805 Fairview Ave.

The company, under the leadership of Charles Wieland, Langdon Parrill and Roland Duquette, will specialize in design and production of micro-miniature precision capacitors and radio interference filters for the military and missile fields.

The Electro Cube executives were formerly associated with the Hopkins Engineering Co.

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Sacramento Gold Dredging Company Enters Space Age

SACRAMENTO, CALIF. — The long time Sacramento gold dredging company, the Natomas Co., is entering the space age. The newly formed Natomas Manufacturing Co. will build ground-support equipment such as test stands, bracketry, load cells and measuring devices for the missile industry.

Ivan Allen, manager of the manufacturing concern, said the company also will perform tooling, fabrication and machine work for private industry and will rebuild machine tools. He said the present 60 employees will be doubled within the next six months.

\$150,000 Plant Underway at Fresno for Wingate Co.

FRESNO, CALIF. — Herbert N. Ferguson of the industrial committee of the Fresno County-City Chamber of Commerce, has announced that construction has been undertaken by the Wingate Co., Inc. on a \$150,000 facility.

The firm will operate an office, plant, warehouse, sulphur mill and a wholesale lumber business.

Idaho Maryland Acquires Denver Steel and Iron

LOS ANGELES—Idaho Maryland Industries Inc., here, has purchased the business and inventory of Denver Steel and Iron Works Co. of Denver for a total of approximately \$300,000 in cash and notes, according to an announcement by George J. Morton, president of IMI.

The newly acquired company, which will operate as the Denver Steel & Iron Works Div. of IMI, has been engaged in the fabrication and processing of structural steel since 1910, and is currently operating with yearly sales of approximately \$1,500,000, Morton said. He also stated that, although more than 80% of its sales have been in the non-defense area, the new division will play an important role in IMI's present participation on construction of components for the Minuteman missile silos.

Denver Steel & Iron Works will continue operations at its present 25,000 sq. ft. plant with 75,000 sq. ft. yard area for outside manufacturing and storage. Sam A. Wilson has been appointed general manager of the new division.

Stanford Making Study Of Smog in Southland

FULLERTON, CALIF.—Studies aimed at identifying chemical reactants which produce various components of smog will be conducted by the Stanford Research Institute (SRI) with a special infrared spectrophotometer capable of identifying the compounds at concentration levels in parts per billion.

The instrument, built by the Scientific and Process Instruments Division of Beckman Instruments, Inc., was equipped by the division's Custon Products Department with a dual seven-foot-long multiple reflection gas cell which will measure the concentrations of pollutants in a sample of air. The pollutants will then be identified by the spectrophotometer.

Dr. J. Leslie Jones, SRI's project supervisor for air pollution, says the IR - 7 infrared spectrophotometer, with its custom-designed cell, will enable the Institute to "determine precisely the kind of chemical reactions that produce smog in the air we breathe."

Specifically, the instrument will be used to identify chemical reactants that produce such smog constituents as hydrocarbons, nitrogen oxides, and ozone.

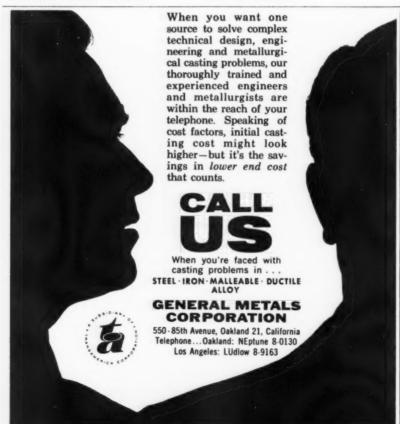
SRI will employ the spectrophotometer in its Southern California Laboratories in South Pasadena, where the Institute is conducting air pollution studies for the U. S. Public Health Service, the Air Pollution Foundation, the State of California Department of Public Health, and private industry.

Dr. Jones says the IR-7 also will be used in research on laboratory smog identical to that found in the atmosphere, and in the study of methods and techniques for evaluating several commercial devices to control automobile exhaust fumes.

Koppers Opens Alaskan Wood Treating Facility

KETCHIKAN—A new wood preserving plant opened here in Whittier by the Koppers Co., Inc. marks the first time pressure-treated wood has been produced in Alaska, according to plant manager, Guy Phillips.

The plant, now equipped to creosote ties, poles, piling and lumber, also will produce "nom-com" fire protected wood that is resistant to fire and flame spread.



. . . for more details, circle No. 64 on Reader Service Postcard

Lockheed Builds First Hydraulic Jig Positioner



Operator with control box in hand is controlling the hydraulic jig positioner, first in the airframe industry, that is reducing fixture setting time by 80%, according to Lockheed. When used with conventional optical tooling, the positioner lifts and holds components in place while connection points are located precisely. Positioners use six hydraulic cylinders to guide jig components weighing up to a ton. Engineers report increments can be maintained accurately to .0002-in.

GE's New Computer Lab Underway at Sunnyvale

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SUNNYVALE, CALIF.—Construction began last month on the General Electric Co.'s new 39,000 sq. ft. computer laboratory. Completion of the \$1,-500,000 laboratory building is scheduled for the end of this year, with occupancy early next year.

Site of the new laboratory is at the Internation Science Foundation complex, about 39 miles south of San

Clair C. Lasher, general manager of the General Electric's Computer Dept. at Phoenix, Ariz., said work at the new laboratory will be devoted to advanced computer technology in industrial and commercial areas. Such fields as circuits, computer devices, advanced logic, character reading, information-theory studies, configurations and mechanisms will also be covered, he added.

Laboratory work is now being done in rented facilities at nearby Mountain View. A staff of some 100 is currently working on many aspects of applied research and advanced development in information technology and processing. Dr. C. F. Spitzer is manager of the laboratory which is designed for expansion.

P-I-E Building New Terminal at Spokane

OAKLAND, CALIF .- Plans for a new large Pacific Intermountain Express motor freight terminal in Spokane, Wash., have been announced by the firm's president A. S. Glikbarg. Construction of this combination general freight and bulk commodity facility, he said, will provide the maximum in efficient, economical and rapid truck service to and from the area. Total investment will exceed a quarter of a million dollars.

The new installation will be erected on a 53/4-acre tract of land at the southwest corner of Broadway Ave. and Havanna St. P-I-E will move from its present location at East 800 Third Ave. and occupy its new terminal about January 1, 1962.

Plans call for a 70 by 200-ft. dock with 36 doors; a 40 by 72-ft. office of split-level design; and a 40 by 80ft. shop. Fueling facilities will be installed also.

F. S. Tandy, P-I-E's director of real properties, said the terminal design was developed after extensive studies of both yard traffic patterns and dock operations in order to insure rapid inbound and outbound handling of freight.





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Aerojet General Forms New Space Subsidiary

Los angeles—Aerojet-General Corp. has announced the formation of a major new subsidiary for the design and development of complete missile and space systems.

The new company, Space-General Corp., will combine the veteran staffs in missile-space technology of Aerojet's Spacecraft division and Space Electronics Corp. The latter has been an Aerojet subsidiary since late last year.

As part of a multi-million dollar investment in facilities and capital expenditures, a new plant will be built for Space-General on a 73-acre site already selected in the Los Angeles area.

"By combining Space Electronics with aspects of Aerojet capability, the new corporation represents the necessary blend of know-how in electronics, propulsion, structures, and systems concepts, as well as assembly and fabrication of missile-space systems," he said.

"In addition, all of Aerojet's broad engineering and production capabilities will be put behind the new organization for support or subcontracting purposes, and other elements of Aerojet may be merged into Space-General in the future."

Dr. James C. Fletcher, president of Space Electronics, has been elected president of the new company. Frank W. Lehan, formerly executive vice president at SEC, will be executive vice president.

Space-General's first building of 200,000 sq. ft. will be ready in early 1962 at its new site just east of Los Angeles at San Bernardino Freeway and Rosemead Blvd.

For the present, the company will be headquartered at the facilities of Space Electronics at 777 Flower St., Glendale, Calif.

Ore-Ida Foods Building Cold-storage Warehouse

SALT LAKE CITY—Plans for construction of a \$400,000 cold-storage warehouse building at its plant in Burley, Ida. have been announced by Ore-Ida Foods, Inc.

Other expenditures planned by the company include \$100,000 for additional equipment in the firm's plants at Burley and Ontario, Ore., and \$100,000 for construction of potatostorage cellars.

Hewlett-Packard and Sanborn Co. Combine

PALO ALTO, CALIF.—Combination of the Sanborn Co., Waltham, Mass., with the Hewlett-Packard Co., Palo Alto, was approved last month by stockholders of both companies. The approval was announced by David Packard, president of Hewlett-Packard, and James L. Jenks, Jr. chairman of the Sanborn board of directors.

The combination, already approved by the boards of directors of each company, becomes effective August 31. It unites Hewlett-Packard, manufacturers of precision electronic measuring instruments, with Sanborn, a producer of equipment for medical and industrial applications.

Sanborn will continue as a separate corporation under its present name, retaining its present personnel, management and policies.

Extrusion Die Company Opens Western Facility

SAN JOSE, CALIF. — A new plant for producing extrusion dies went into operation here last month at 1309 Bayshore, according to an announcement by *John Wall*, president of PMD Extrusion Die Co., of Warren, Mich.

The San Jose plant is centrally located to serve the 23 leading extruding plants along the West Coast.

Covering 6,400 sq. ft., the plant contains complete facilities for welding and heat treating as well as machining. The plant will be under the direction and supervision of A. W. Hamel. A. R. Kadrovach has joined the company as manager in San Jose and William Fritz, Jr., will be in charge of sales.

Burton Mfg. Occupies New Headquarters Bldg.

NORTHBRIDGE, CALIF. — President of Burton Mfg. Co., Santa Monica, Calif., has announced that Burton's Instrument Div. and Trans Electronics, Inc., a wholly-owned subsidiary formerly at Canoga Park, Calif., have relocated in the company's new headquarters building, here.

The new facility, in the Nordhoff-Winnetka Industrial tract, comprises 27,000 sq. ft. and cost \$250,000. Of tilt-up construction, the building features an unusual concrete canopy, precast and poured in place.

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... for more details, circle No. 68

Pacific Vegetable Oil Leases Southland Plant

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LONG BEACH, CALIF .- Pacific Vegetable Oil Corp., a San Francisco based international trading and commoditying processing firm, has leased the large Spencer-Kellogg vegetable oil processing plant in Long Beach, Chamber of Commerce officials announced recently.

The property, consisting of some 81/2 acres and abutting Cerritos Channel in the Long Beach Harbor area, includes 13 buildings with a total square footage of over 185,000.

Included in the buildings is a fourstory complete oil refinery, two mill buildings, an eight-unit tank farm having a 1,460,000 gallon storage capacity and a grain elevator with a 296,000 bushel storage capacity. There is also a meal grinding and shipping building, a flax warehouse, a cake storage building, a copra storage warehouse, plus service buildings and equipment, a dock warehouse, and an office build-

With the addition of this Long Beach facility, Pacific Vegetable Oil now has three deep-water loading lo-

Pacific Vegetable Oil leased the property from Union Pacific Railroad for 25 years with an option to buy.

Weyerhaeuser Opens New Olympia Container Plant

OLYMPIA, WASH .- The Weyerhaeuser Co. formally opened a new shipping container plant east of here which will eventually employ about 100 workers.

The plant is producing all types of corrugated containers from paperboard supplied by Weyerhaeuser mills at Longview, Wash. and Springfield, Ore.

The 95,000 sq. ft. facility is the 26th shipping container plant operated in the Pacific Northwest. The company also has a container plant near Yakima, Wash.

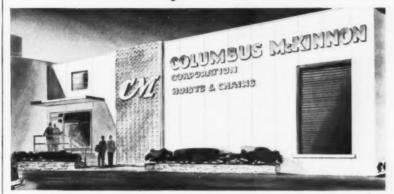
Bell Electronic Opens San Diego Warehouse

SAN DIEGO, CALIF.—Bell Electronic Corp., manufacturing and warehouse specialists, has opened a modern, new stocking warehouse here at 8072 Engineer Rd.

According to David S. Matson, marketing manager at Bell the new warehouse supplements Bell's San Diego sales office. Edwin A. Lothian is in charge of the operation.

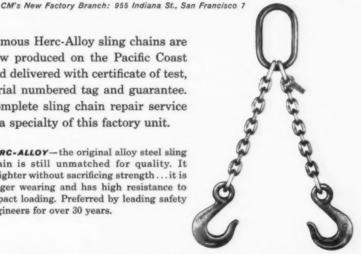
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Pacific Foundry & Metallurgy Acquires Bartlett & Snow Co.

SAN FRANCISCO—Pacific Foundry and Metallurgy Co. here, has acquired C. O. Bartlett & Snow Co. of Cleveland, Ohio. The 76-year old Bartlett and Snow Co. manufactures kilns, coolers, dryers and other heat engineering equipment; integrated foundry systems; elevating and conveying equipment for the process industries, and specialized agricultural machinery.

The two companies will operate as separate divisions of a new corporation to be known as Bartlett-Snow-Pacific. Inc.

This is a correction of a story which appeared in the July issue of *Western Manufacturing* erroneously reporting that Bartlett & Snow had acquired Pacific Foundry and Metallurgy Co.

General Appraisal Moving Offices to Los Angeles

LOS ANGELES—William M. McCloy, vice president of the General Appraisal Co., has announced the company's plans to transfer its administrative and general office operations to Los Angeles from Seattle.

GE, Hanson-Van Winkle In Licensing Agreement

Los ANGELES — General Electric and Hanson - Van Winkle - Munning Co. have announced a license agreement that will enable H-VW-M to market a new process that GE has developed to machine the tough new "space age" alloys.

Called electrochemical machining the process permits stress-free machining of complex contours in any metal, including the refractory alloys, in a single operation. The process also makes it possible to hold extremely close tolerances.

Electrochemical machining makes significant savings in metal-removal operations possible at a relatively low capital investment cost. The process was developed at General Electric's Flight Propulsion Div. to machine jet engine components.

In addition to the licensing of several GE patents, the agreement calls for the transfer of GE know-how through the training of Hanson-Van Winkle-Munning personnel. H-VW-M is currently making personnel and space available for work on the project.

Plastic Engineered Products Opens Plant, Three Shifts

DENVER — The Plastic Engineered Products Co., a division of Griffith Industries, Inc., with B. J. Griffith as president, recently opened its plant at 2385 S. Lipan St.

Under the direction of *Dale Woods*, plant superintendent, the plant will produce up to 12" diameter pipe, and will operate three shifts daily.

Plastic pipe and tubing and other plastic products used in transmission of caustic fluids in the chemical and petroleum industry will be produced, also pipes used for water mains, sewer lines, electrical conduit and lawn sprinkler systems.

New Engineering Building for Skagit Steel & Iron

SEATTLE—Skagit Steel & Iron Works broke ground last month for a large, modern engineering office building at its Sedro-Woolley plant. The new facility will provide increased facilities for its engineering program in the fields of applied sciences and industrial techniques.

The company makes logging equipment and Army Ordnance items.



There's an efficient design in the complete line for every farm and industrial application. Straight spur gear, angle drive bevel gear, worm gear units...all are available in stock models or customized at modest cost for individual h.p. and ratio requirements.

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While numerically controlled Pratt & Whitney Numeric Keller shapes a complex helicopter gearbox cover, right, programmer studies Auto Promt statements describing surfaces of the part. Only 180 such statements in an English-like language were fed into a com-puter, under control of the master program tape, foreground, to produce more than 8000 detailed instructions for the tool to follow in milling the part.

LOS ANGELES - A new system of automatic programming for machine tools has been developed by International Business Machines and is considered to have great potential for airframe, missile, and general metalworking industries. It is now available for Western use.

Called "Auto Promt," it enables programming and generation of tool paths for three dimensional surfaces with a numerically controlled machine tool. This path generating ability is automatic and all the programmer uses is a basic description of the part to be milled. Language is like basic English and is used to describe the part, tooling, requirements, tolerances, speeds, feeds, and other general machining data.

Claimed by IBM spokesmen to be practical for automation of limited run production of complex shaped hardware, dies, matrices, Auto Promt is designed to reduce lead time on parts from blueprint to production. Seldom before has prototype production justified expense of programming a machine tool, but with the Auto Promt system, time savings and reduction of human error makes it applicable to small lot projects.

The part programmer works from part drawings and having the basic tool in mind for performing the cuts, writes a series of statements in Auto Promt language. This consists of 110

words such as cone, cylinder, sphere, angle, axis points, intersection of, surface points etc. With such language the programmer is enabled to describe the part and its surfaces and the basic machining instructions needed for each region of the part. He also indicates mode of machining, cutting tool dimensions, tolerances, speeds, feeds.

The information is punched into cards and fed into a computer. Also fed to the computer is the Auto Promt processor program, a series of more than 30,000 instructions to enable the computer to generate automatically from the source program the tool paths necessary to operate the machine tool used.

Final output from the computer is called the object program and contains a complete set of numerical instructions to the machine tool. The program is reproduced on magnetic tapes which can be converted into perforated tape or punched cards depending on the input requirements of the numerical control equipment used.

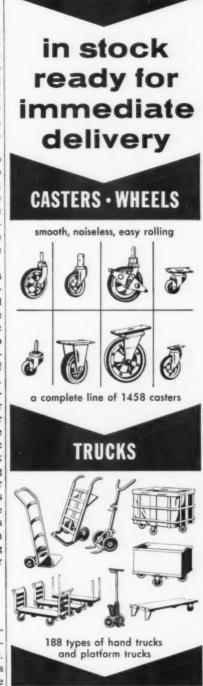
The original program can be retained on magnetic tape as a master that can be duplicated as needed for other job shops producing the same part. Auto Promt also has diagnostic features that enable the user to check input and to locate errors during and after processing. The computer will print out errors or inconsistencies it finds in source data and before chips are made the system produces a list of coordinates that indicate each successive tool position. By reading or plotting these coordinates, the user can visualize the entire tool path.

Detroit Diesel Appoints New Seattle Distributor

SEATTLE - The Detroit Diesel Engine Div. of General Motors has appointed Emerson GM Diesel, Inc. here, distributor for the Division's line of truck, industrial and marine Diesel engines in Western Washington and a section of southern Alaska.

The company, a newly established firm, succeeds Modern Motors, Inc., a Division of Evans Engine and Equipment Co. The latter company continues as a Detroit Diesel distributor at Anchorage.

Headed by D. M. Emerson, Jr., the new firm has a 6,000 sq. ft. shop area at 5057 E. Marginal Way.



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Circle No. 73 on Reader Service Postcard

Purex Corp. Expanding Warehouse Facilities

TACOMA, WASH.—As part of an expansion involving the manufacture of several new products, the Purex Corp., Ltd., has begun construction of an \$80,000 warehouse at 2001 Thorne Rd., according to A. F. Caillouette, branch manager.

The new facility will comprise about 16,000 sq. ft. for warehousing, and free the firm's present 26,000 sq. ft. building for manufacturing use.

Northern California Rep Named by Carrier Div.

BERKELEY, CALIF.—Stiehl & Co., 605 Addison Ave., here, has been appointed northern California representative by the Carrier Div. of Chain Belt Co., Louisville, Kentucky.

The Carrier Div. manufactures vibrating equipment and process machinery, including conveyors, variable-rate feeders, screens, grizzly feeders, louvered bar screens, spiral elevators, heat transfer equipment, and vibrating air slides.

Castle & Cooke Form Land Development Firm

SAN FRANCISCO — Formation of a new company, Oceanic Properties, Inc., to manage and develop lands owned by Castle & Cooke, Inc., and its subsidiaries was announced simultaneously in Honolulu by A. G. Budge, chairman, and in San Francisco by Malcolm MacNaughton, president.

The new firm will be a wholly owned subsidiary of Castle & Cooke and has been formed to provide more coordinated and concentrated attention to use and development of Castle & Cooke lands and those of its affiliates.

Frederick Simpich, Jr., will resign as vice president of Castle & Cooke to become president of Oceanic Properties. The latter company will establish offices and other facilities at a location yet to be chosen.

Formation of the new company is an indirect result of the merger of Dole Corp. and Bumble Bee Seafoods, Inc., formerly Columbia River Packers Association into Castle & Cooke.

Hamilton Tool Firm Completes Expansion

PHOENIX — Hamilton Tool Co., 4006 W. Van Buren, established in 1956 as a one-man shop, has completed a 2,000 sq. ft. addition to the main building.

Harlan M. Hamilton, owner, said the expansion also included the acquisition of new machinery and equipment. The addition has been arranged to permit further expansion, Hamilton said.

The company handles machine shop jobs and product engineering and development. It also manufactures components.

American Junior Aircraft and Pactra Chemical Merge

PORTLAND — Manufacturers of model airplanes, the American Junior Aircraft Co., here, has recently merged with Pactra Chemical Co., Inc., Los Angeles.

Pactra Chemical Co. is a supplier of paints and adhesives to the hobby and toy industry. The merger will result in a step-up in personnel and production with an extra shift being added to the Portland plant.

Sales will be handled through the combined sales organizations of the two companies.



Stauffer Chemical to **Build Chlorine Plant**

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DOMINGUEZ, CALIF.—Stauffer Chemical Co. has begun construction of a multi-million dollar captive chlorine plant here. Completion of the project is scheduled for the third quarter of next year.

Total chlorine output will be supplied by pipeline to American Chemical Corp., jointly owned by Stauffer and Richfield Oil Co., as a raw material for the manufacture of vinyl chloride, ethylene chloride and ethylene dichloride. The co-product will be consumed by Stauffer.

Engineering and design is being handled by Stauffer's Engineering

Stauffer Chemical Co. currently has chlorine-producing plants at Niagara Falls, N. Y., and at Henderson,

NCR Building \$1,000,000 **Denver Training Center**

DENVER-The National Cash Register Co. has announced plans to build a \$1,000,000 training center here with classes scheduled to start next spring.

Construction will begin in mid-August at the southeast corner of Valley Highway and S. Colorado Blvd., said T. D. Greer, manager of the firm's local office.

NCR will train 1200 technicians a year in the repair and maintenance of cash registers, accounting machines, data recording equipment, electronic bank bookkeeping machines and electronic check sorters.

The air-conditioned, 35,000 sq. ft. building will be of modern design, two stories, with concrete block, stone and glass exterior, Greer stated.

U. S. Steel's Processing **Plant Under Construction**

ATLANTIC CITY, WYO. - Now under construction is the multi-milliondollar U. S. Steel Corp. iron ore processing plant here.

Estimated to cost \$50 to \$70 million, the plant will upgrade the taconite iron ore of the area, concentrating it into pellets with more than 60% iron content for shipment to the blast furnaces of the U. S. Steel's Columbia-Geneva division near Salt Lake City.

Wyoming officials estimate there is enough ore to keep the plant running 35 years as a major boost to the State's economy.

\$1,000,000 Factory for Hawaii Aluminum Firm

HONOLULU-A \$1,000,000 aluminum extrusion plant is currently under construction at Pier 35, here, and is expected to be in operation by October, according to Michel A. Picard, executive vice-president and general manager of Hawaii Aluminum Co.

The plant, first of its kind in Hawaii, will turn out architectural shapes in aluminum, enabling fabricators to manufacture aluminum furniture, office equipment and other items in Hawaii.

Hawaii Aluminum also plans anodizing and smelting facilities. Picard said. Output the first year is expected to represent about \$4,000,000 in sales.

Sperry Hosts Group Seeking Cost Savings

PHOENIX, ARIZ. - More than 150 executives from firms selling goods and services to the electronic industry met with Armed Forces procurement experts to search out ways to cutting production costs in a seminar held at Sperry Phoenix.

The meeting was held because of demands from the military for maximum value for dollar spent, according to Percy Halpert, manager of Sperry

Rand Div.

Participants heard Sperry operations manager Robert B. Roe who keynoted the session. They also viewed a number of exhibits featuring value analysis programs conducted to seek ways to reduce cost of production.

Clark Equipment Makes **Douglas Handling Device**

SANTA MONICA, CALIF.—Clark Equipment Co. has received licensed rights to make and sell a new system of material handling by air flotation developed by Douglas Aircraft Co.

Called "Glide-Aire", it operates on a principle similar to that used by "ground effect" vehicles that ride over the ground or water on a cushion of

In material handling applications, a frictionless air bearing is created under a load by controlled air pressure. On this air cushion loads can be moved in all directions with minimum effort.

The system is applicable to rail cars, truck trailers, warehouses and freight terminals. Clark reports that production models will be available in 1962.



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\$2,250,000 Rolling Stock Added by Ringsby Truck

DENVER — Representing the largest single equiment purchase in the history of Ringsby Truck Lines, Inc., nearly \$2,250,000 have been invested by the Denver-based motor common carrier in rolling stock for broadly expanded shipper service throughout Western states.

In announcing the equipment expenditure, Gail H. Crawford, executive vice president and general manager for Ringsby indicated that the total investment involved purchases for both Ringsby and Fortier operations.

Ringsby assumed active management of Fortier in May, after receiving temporary operating authority from the ICC and the California Public Utilities Commission. Although a contract has been signed by officials of both Fortier and Ringsby, the merger is pending final ICC approval.

Crawford indicated that more than \$1,700,000 was spent on the modernization of Fortier's rolling stock.

Included in the Fortier equipment purchases were a total of 50 White Freightliners made to Ringsby specifications to accommodate 65 foot length limit laws. Trailer equipment included a total of 97 Brown 27½ foot trailers; 50 Fruehauf 27½ foot vans and 30 Fruehauf 27½ foot flatracks.

Band-It Co. Acquired By Investment Group

DENVER—The purchase of Band-It Co. here, by a group of investment interests has been announced by *Holbrook Mahn*, president. The 24-year old industrial pressure clamp manufacturing firm markets its products through 1500 industrial distributors in the United States and 73 other countries.

Terms of the acquisition were not disclosed. Net sales of the company exceed \$2.000.000 annually.

In disclosing the sale, Mahn also announced his plans for retirement as president. Joseph E. Bell, Chicago attorney, will be chairman of the board of the new company. Val Lodholm has been elected president, having served as vice president for 13 years. Jack M. Evans, director of research and development has been named vice president, and M. E. Forsyth is treasurer.

American Electronics, Inc. Completes Fullerton Move

Los ANGELES—American Electronics, Inc., has announced the relocation of their general office from 1725 West Sixth St., here, to 1594 East Ross Ave., Fullerton, Calif.

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Since completion of the new \$1,500,000 facilities in late 1960, the Electro-Mechanical and Precision Power Divisions, formerly in Los Angeles and in El Monte, respectively, have been relocated to this site. Also inn this area is the American Laboratories Div. at 1536 East Ross Ave.

The company also has an instrument Div. at Culver City, Calif.

Shell Oil to Build Hawaii Installations

HONOLULU—Monroe E. Spaght, president of Shell Oil Co., announced here recently that his company plans to build more installations in the Island to keep up with Hawaii's growth.

Spaght did not elaborate on what new facilities Shell plans except to say that they will be "installations of various kinds. I wish I could say more," he said.



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Burton Acquires Technical Plastics of San Mateo

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SANTA MONICA, CALIF.—The first step in an acquisition and diversification program previously outlined to share-holders at the annual meeting in May was taken today by the Burton Manuturing Co. here.

President William J. Miller announced that Burton has acquired Technical Plastics, Inc., of San Mateo, Calif. with final action contingent upon a favorable tax ruling.

Barney Bristow, president of Technical Plastics, Inc., in making the joint disclosure estimated that \$600,000 to \$800,000 in sales will be added to Burton's present annual volume. The company will continue to operate in its present San Mateo facility as a division of Burton Manufacturing Co.

Technical Products is engaged in the highly technical field of extreme temperature plastics, such as missile skin fairings, telemetering antenna windows, flame shields, epoxy molds and thin-walled cylinders.

June Defense Employment Higher in California

san Francisco—Employment in two defense-related industries in California increased by nearly 20,000 in the past 12 months, and this combined gain outweighed a decline of about 14,000 in aircraft, *John F. Henning*, California Director of Industrial Relations, reported last month.

Employment in missiles plants of 69,700 wage and salary workers this June was an all-time high and above last June's count by 9,900. The number employed in electrical equipment, including electronics, was at a near-record total of 175,300, which exceeded the year-earlier count by 9,400.

Kollstan Semiconductors Installs Liquid Argon

GOLDEN, COLO. — A modern liquid argon installation with a capacity of 100,000 cu. ft. of argon went into service recently at Kollstan Semiconductor Elements, Division of Kollsman Instrument Corp., here.

Designed and installed by Linde Co., Division of Union Carbide Corp., the new unit stores liquid argon at about 300 degrees below zero F., and automatically converts it to a gas on demand. Kollstan utilizes the inert characteristics of gaseous argon in the manufacture of crystal element subassemblies for transistors, diodes, and other semiconductor devices.

Kelley Co. Names Chaitin Northern California Rep

SAN FRANCISCO—Neil D. Chaitin, Pier 62, here, has been appointed as exclusive representative for the Kelley Co., Inc., in the northern California territory. The Kelley Co., with head-quarters at Milwaukee, Wisc., manufactures dockboard.

Chaitin set up his own material handling organization, the Chaitan Equipment Co., June 1 to specialize in helping owners, architects and contractors lay out and build efficient shipping and receiving docks.

Port of Tacoma Site for Smith-Blair, Inc.

TACOMA, WASH. — Smith-Blair, Inc., of South San Francisco has purchased a tract of land from the Port of Tacoma for building a sales office and warehouse.

Producers of pipe connections and repair clamps for water, gas and oil pipelines, the company will build a 50 by 80 ft. facility at 1952 Milwaukee Way.

Husky Oil Completes \$7,500,000 Expansion

CODY, WYO.—The Husky Oil Co. has formally dedicated its expanded refinery and new pipeline facilities here, culminating more than three years of planning and construction.

The \$7,500,000 improvement program substantially changed its refining and marketing position, said *Glenn E. Nielson*, president. The new refinery units include a fluid catalytic cracker, an alkylation unit and a gas concentration unit. Plant capacity was increased from 7,000 to 9,000 barrels a day and can be further expanded to 12,000 barrels.

The 96-mile pipeline runs from Cody to Billings, Mont.

ElectroVision to Acquire Packaging Services Firm

Los ANGELES — ElectroVision Corp. will acquire Packaging Services of California, specialists in packaging engineering, containerization and complete services for shipment of electronics and aerospace instruments, pending approval from the State's Commissioner of Corporations, according to Martin Stone, president.

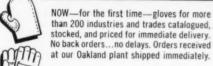
The addition of Packaging Services, No. Hollywood, Calif., is expected to substantially increase Electro-Vision's sales volume. The new subsidiary's current backlog approximates \$2.000.000.

Robert Salembier, president of Packaging Services, will continue to head its operations. No personnel changes are planned. Presently over 50 people are employed and its facilities are approximately 100,000 sq. ft.

Stone anticipates the new subsidiary should double its output in each of the next three years.

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Contract News for the West

The U. S. Army Ordnance through its San Francisco Ordnance District at 1515 Clay St., Oakland, Calif., announced June 28 the award of contracts totaling \$15,984,420 to the *Pacific Car & Foundry Co.*, Renton, Wash. The contracts call for production of a new generation of air-transportable, full-tracked, self-propelled artillery. Additional contracts for \$1,500,000 call for repair parts, tools and services.

The artillery vehicles are designed to mount interchangeably large cannon or howitzers as part of the Army program of standardization to reduce spare parts inventory, eliminate depot stocks, and save money. The low-silhouette vehicles and gun mounts can be carried in cargo planes and dropped by parachute.

The U. S. Army Ordnance District, Los Angeles, with headquarters at 55 S. Grand Ave., Pasadena, awarded more than \$7,200,000 in materiel contracts to industries throughout the Southland during the eight weeks ending June 23. The awards included the following:

Consolidated Western Steel Div., U. S. Steel Corp., Los Angeles, four awards totaling \$1,531,582, connected with the Little John rocket.

Aerojet-General Corp., Downey, Calif., a \$977,919 classified contract; \$337,922 for Hawk missile warhead and booster; and \$35,775 for research and development.

National Supply, Torrance, Calif., \$988,760 for gun tube forgings.

Norris-Thermador Corp., Vernon, Calif., two awards totaling \$732,878 for cartridge cases.

Gilfillan Brothers, Inc., Los Angeles, five awards totaling \$555,134 for Corporal missile technical manuals and repair parts.

Nortronics Div., Northrop Corp., Anaheim, Calif., \$277,350 for Hawk missile engineering services; \$145,638 for Hawk repair parts; and \$113,552 for Hawk wing assemblies.

Harvey Aluminum, Inc., Torrance, four awards totaling \$367,054 for metal parts and piston assemblies, and three awards amounting to \$118,100 for research and development.

Douglas Aircraft Co., Inc., Santa Monica, Calif., \$236,857 for Nike missile system repair parts, and \$30,-649 for transporters.

Horkey-Moore Associates, Torrance, \$168,377 for production engineering on aircraft canopy removers.

Grand Central Rocket Co., Redlands, Calif., \$124,000 for research of propellant grains. Radioplane Div., Northrop Corp., Van Nuys, Calif., \$120,000 for target missiles.

Engineered Magnetics, Division of Gulton Industries, Inc., Hawthorne, Calif., \$109,983 for design, engineer and fabricate amplifier units.

McCulloch Corp., Los Angeles, \$93,000 for target missile engines.

Autonetics Div., North American Aviation, Inc., Downey, \$55,328 for digital computer work.

Lyne S. Trimble, North Hollywood, Calif., \$47,117 for magnetic tape development; California C o m p u t e r Products, Inc., Downey, \$35,420 for design and development of battery display units; Hydraulic Research & Mfg. Co., Burbank, Calif., \$30,099 for Hawk missile repair parts; and General Dynamics, Pomona, Calif., \$29,983 for continued development of Mauler guided missile system.

Other contracts reported to WEST-ERN MANUFACTURING during the past month include:

Norris Div., Norris-Thermador Corp., Vernon, Calif., more than \$2,-000,000 for follow-on production of Zuni rocket assemblies for the U. S. Navy.

Telecomputing Corp., Los Angeles, orders totaling over \$1,600,000 from Boeing Co. for equipment to be used with Minuteman missile and commercial and military jet aircraft; \$300,000 from Navy for spring energized subminiature gyroscopes to be used on the Mark 44 torpedo; and, \$170,000 research and development contracts to Telecomputing's Electronic Systems Div., No. Hollywood, for devices which incorporate important technological advancements in the fields of precision angle measurement and airborne flight history recording.

Lenkurk Electric Co., Inc., San

Carlos, Calif., \$900,000 worth of Type AN/FCC-17 multiplex sets to be installed in the USAF Strategic Air Command's flying command posts, a subcontract to Electronic Communications, Inc., St. Petersburg, Fla. Also a \$790,000 U. S. Air Force contract to modify and expand a military microwave communications system on Formosa.

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Hoffman Electronics Corp., Los Angeles, two contracts totaling \$790,000 from Sylvania Electric Products, Inc., for redevelopment of a radio receiving set and delivery of 36 production units.

American Avionics, Inc., Los Angeles, \$734,163 from Navy for the development and quantity production of advanced radar test equipment for the Bureau of Ships.

Weber Aircraft Corp., Burbank, \$670,000 for design and manufacture of a unique, telescoping "Airstair" for the new Boeing 727 short-range jet airliner. Contract includes detail design and tooling as well as production of 40 sets of the Airstair for Eastern Airlines.

Zero Mfg. Co., Burbank, \$340,000 for containers to be used for storage and shipment of electronic instruments and parts for the Navy Polaris missile system; also contracts totaling some \$205,000 from Autonetics, ITT(Continued)

Classified Section

Space is sold as advertisers' inches. All advertisements in this section are $V_{\rm A}$ inch short of contracted space to allow for borders and composition. Rates are \$16.00 a column inch. Copy should be sent in by the 20th of preceding month if proofs are required; by the 25th if no proofs are required.

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CONTRACTS . . . (Continued)

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Kellogg and Raytheon for specialized aluminum shipping and storage containers. Zero's White Div. in Palmer, Mass., will be involved in the Polaris job.

Networks Electronics Corp., Chatsworth, Calif., \$225,000 for infrared dewar detectors from ACF Electronics Div. of ACF Industries, Inc., Paramus, N. J.

General Electric Co., San Jose, Calif., \$200,000 to supply nuclear instrumentation for Atomic Energy Commission reactors at Hanford, Wash., and Oak Ridge, Tenn.

Colorado Research Corp., Broomfield, Colo., a subsidiary of Bell & Gossett Co., Morton Grove, Ill., \$157,226 to design and manufacture microwave refractometers for a new Missile Trajectory Measurement System under development by General Electric for the Air Force.

William L. Weitzel, Jr., Seattle, \$109,435 for janitorial services in the 700 and 1100 areas of Hanford Works, Wash.

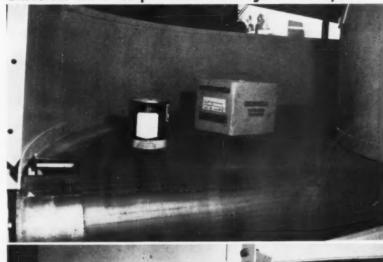
Micro Gee Products, Inc., Culver City, Calif., \$102,000 from George C. Marshall Space Flight Center, National Aeronautics and Space Administration for specialized testing equipment for missile and spacecraft guidance systems.

Smith Dynamics, Div. Smith Industries International, Inc., Compton, Calif., \$100,000 to supply control rod assemblies for an atomic reactor at Hanford Works from Kaiser Engineers.

Northrop Corp.'s Norair Div., Hawthorne, \$79,000 to study sealants and self-sealants to protect spaceships from the space environment from Nonmetallic Materials Lab, Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson Air Force Base, Dayton, Ohio.

Dashew Business Machines, Inc., Los Angeles, \$70,000 from Air Force for installation of a new source data recording and transmitting system at Tinker Air Force Base, Oklahoma.

Rocket Power, Inc., Mesa, Ariz., \$68,000 for GILA III solid propellant sled rockets to be used in a new research program by Sandia at the Holloman Air Force Base test track. Universal Ecsco Corp. Builds 90 Degree Conveyor





Upper Photo: With conveyor belt in operation, a package and container are shown making the 90 degree swing. Note taper of tail pulley. Experimental model is powered with a 2 hp electric motor.

Lower Photo: Closeup of inner radius of conveyor shows edge bearings that control belt on both top and return runs. Belt has reinforcement on edge that comes in contact with bearing surfaces.

DOWNEY, CALIF.—In development at Universal Ecsco Corp. is a conveyor system that incorporates a 90 degree turn with a continuous belt that will span a 48-in. width in production models.

Called a Curve-Flo Conveyor it is using belting produced by Goodyear. Design of the system calls for use of edge bearings, equally spaced, along the inside arc of the belt on both the top and return runs.

Bearing surfaces touching the edge of the belt are 134-in. in diameter. The 3/16-in. belt coming in contact with the edge bearings is reinforced with rubber stripping to combat wear. Called an inner edge reinforcement cap, it is applied in 11/16-in. long sections that are 5/16-in. thick.

Head and tail pulleys are equipped with a minimum diameter of 6-in. at the inside edge of the belt and are tapered larger in proportion to the inside radius of the belt.

The basic merits of such a 90 degree turn system are to provide a smooth, non jarring ride for packaged items subject to breakage, according to Ecsco spokesmen.

Rebuilt Columbia Mill Resumes Lumber Work

ANCHORAGE—A new Columbia Lumber Co. sawmill to replace the mill destroyed by fire last year, began operations at Whittier recently.

Thomas A. Morgan, president, said the Whittier sawmill will eventually produce 2,000,000 board feet of lumber a month. Thirty to 40 men will be employed in the current operation and a second shift will be added later.

Colin Campbell is manager of the mill.

Western MANUFACTURING

WESTERNERS AT WORK



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F. C. Bishop American Can



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R. B. Parkhurst Hughes Aircraft



Jerome Belsi Gemco



M. F. Mangan Campbell Chain



. E. Wolf



A. C. Kruse Chainveyor

- Paul J. Colleran has joined International Rectifier Corp., El Segundo, Calif., as vice president, engineering.
- F. C. Bishop has been named manager, Pacific Plant, American Can Co., at San Francisco.
- Robert Linquist is newly appointed vice-president, engineering, Security Valve Co., South Pasadena, Calif.
- Raymond B. Parkhurst has retired as vice president, manufacturing, Hughes Aircraft Co., Culver City, Calif., continuing to serve, however, on a consulting basis.
- Jerome Belsky has been named vice-president, manufacturing and engineering, Gemco, Inc., Los Angeles.
- Malcolm F. Mangan, Pinola, Calif., has been appointed project engineer for the 11 Western States by Campbell Chain Co.
- Lyle E. Wolfe is newly named superintendent of the power division, Colorado Fuel & Iron Corp.'s Pueblo, Colo., plant.
- Albert C. Kruse has been appointed factory manager, Los Angeles facilities, Chainveyor Corp.
- William J. Lind has been named assistant district purchasing agent,

- Bethlehem Steel Co.'s Pacific Coast Div., Seattle.
- Arthur W. Towne is newly appointed chairman of Blake, Moffitt & Towne Div., Kimberly-Clark Corp.; and Horton P. Westler has been named president of the San Francisco paper distributor.
- Louis P. Caffar has been named director of transportation for Consolidated Freightways, Menlo Park, Calif.
- Robert L. Deming has been appointed manager of engineering and development of Tracerlab Reactor Monitoring Center, Richmond, Calif.
- Donald B. Prell has resigned as president of Electro Radiation, Inc., Los Angeles, and will devote his time to consulting.
- L. T. Greiner has been appointed assistant to the president of B. F. Goodrich Co., in charge of customer relations, Los Angeles.
- Frank R. Milliksen has been elected president of Kennecott Copper Corp.
- Thomas C. Harris has been elected president of Trans-Alaska Telephone and Communications Engineering, Inc., Anchorage.

- Edward Zacavich has been appointed Hawaii district manager, for Eutectic Welding Alloys Corp.
- Frank A. Seeton is newly named manager, Metallurgical Operations Div., Denver Equipment Co., Denver.
- Carlyle A. Mounteer has joined Consolidated Electrodynamics Corp., Monrovia, Calif., as assistant general manager, Transducer Div.
- William S. Powell has been elected president and chief executive officer, Hexcel Products, Inc., Berkeley, Calif.
- Gaham B. Brown has joined Stauffer Chemical Co. as general manager, Metals Div., Richmond, Calif.
- E. B. Connell is newly appointed lubrication specialist for Woodbury & Co., Portland.
- Raymond Hamada h as joined Houston Fearless Corp., Beverly Hills, Calif., as senior vice-president, operations.
- Joseph R. Ikola has been named chief engineer, Connector Div., Omega Precision, Inc., Azusa, Calif.
- W. L. Whirry has joined the technical staff of Micromega Corp., Venice, Calif.

- Ernest H. Schaper has been elected vice president of operations, Kaiser Gypsum Co., Inc., Oakland, Calif.
- Frank B. Wright, a vice president of Southern Counties Gas Co. until his retirement in 1960, died recently.
- Lewis D. Schley has been named vice president and general manager, Pacific Fruit Express Co., San Francisco.
- Robert D. Dewell recently joined J. H. Pomeroy & Co., San Francisco, as chief engineer.
- W. D. Treat has been named president and general manager; and Alvin L. Becker, chief engineer, Aero-Flex Corp., San Diego, Calif.
- Fluvio F. Garzoli will head the new Product and Modification Engineering section, Lynch Communications Systems, Inc., San Francisco.
- W. J. McMillan has been appointed manager, Los Angeles branch, National Electric Div., H. K. Porter Co.

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- Roy A. Shettel has been promoted to plant engineer for Lockheed's California Div., Burbank, Calif.
- Robert W. Sigg has been named director of labor relations, U. S. Steel's Consolidated Western Steel Div., Los Angeles.
- John R. Bartholomew has been appointed chief engineer of Estey Electronics, Inc., Torrance, Calif.
- Dr. William H. Reas has been appointed manager, Chemical Research and Development, General Electric's Hanford Laboratories, Richland, Wash.
- Harry F. Redgrift has been appointed director of engineering, Western Transistor Corp., Gardena, Calif.
- James C. Callaghan is newly named manager, Operations Staff, Space Sysems Operations, Aeronutronic Div., Ford Motor Co., Newport Beach, Calif.
- J. F. Ray, vice president of General Controls Co., Glendale, Calif., has been named a member of the board of directors, American Gas Association.
- J. Robert Snyder has been promoted to Director, Accident Prevention Bureau, Pacific Maritime Association, San Francisco.

- R. L. Hedd has been appointed senior field engineer, J. T. Hill Co., San Gabriel, Calif.
- Fred P. Ritchie has been appointed general manager, Santa Clara, Calif., paper mill; and Roland E. Boedeker, general manager, 57th Street mill, Los Angeles, Container Corp. of America.
- Jack Russell has been named by Ekco Products Co. as president of its Worley & Co. division in Whittier, Calif.
- Robert H. Thornton has been appointed controller, Mathews Conveyer Co. West Coast, Chico, Calif., replacing C. A. Penberthy, who will serve as secretary-treasurer.
- Oscar D. Wyatt, Inside Sales Manager for Ziegler Steel Service Corp., Los Angeles, died recently.
- George H. Porter has been named chief electronics engineer, Henry Engineering Co., Burbank, Calif.
- Richard S. Anderson has been appointed manager, Weber Aircraft Corp.'s recently activated Electronics Div., Burbank, Calif.
- Wayne Thompson has resigned as vice - president of manufacturing, Horkey-Moore Associates, Los Angeles.
- Robert R. Clark, Assistant to Director, United Steel Workers, AFL-CIO, and Edward J. Hibbert, Industrial Relations, American Can Co., are new chairman and vice-chairman, California Apprenticeship Council.
- C. William Brooks II has been named president of U. S. Industries' Hawaii-Pacific division, Honolulu.
- William M. Swezey has been named to head the operations and engineering support post for the RCA Service Co., White Alice Project, Anchorage.
- Robert A. Gdula, Robert D. Heddens, Jerome D. Patterson and Gerry DePorter have been added to the Research Staff, Gladding, McBean & Co., Los Angeles.
- William C. Teach has joined U. S.
 Borax Research Corp., Los Angeles, as a senior scientist.
- H. Keith Tiedemann has been promoted to comptroller, Connor Spring Mfg. Co., San Francisco.

- Emmett E. Day, Professor of Mechanical Engineering, University of Washington, Seattle, has been named vice president, Pacific Coast Area, American Society of Mechanical Engineers.
- John Parmakian, U. S. Bureau of Reclamation, Denver, has been named a director of American Society of Mechanical Engineers.
- H. Eugene Crow. Jr., has been appointed engineering manager, television systems, Cohu Electronics, Inc., Kin Tel Div., San Diego, Calif.
- Dr. Edwin S. Gould has joined the staff of Shell Development Co.'s Emeryville, Calif. Research Center.
- Theodore S. Hoffman has been named vice president and manager, Semiconductor Div., Hoffman Electronics Corp., Los Angeles.
- William C. Iverson has been named manager, manufacturing engineering, Data Recorders Div., Consolidated Electrodynamics Corp., Pasadena, Calif.
- Robert C. Wayne has been appointed technical services manager, Redel Inc., Anaheim, Calif.
- Dr. Joseph L. Gillson is newly named consultant for the Engineering and Construction Div., Southwestern Engineering Co., Los Angeles.
- Robert F. Butterfield has been named Southern California District manager, Borden Co.'s Western Div.
- James L. Donnelly Jr., has been named district manager, Northern California and Nevada areas for the Steam Generator Div., Clayton Mfg. Co., El Monte, Calif.
- Raymond T. Pierson has joined IMC Magnetics Corp., Marketing Div., Maywood, Calif., as a field engineer.
- James P. Buckley has been appointed director of marketing and planning, Bendix-Pacific Div., Bendix Corp., North Hollywood, Calif.
- Melvin C. Oelrich has been elevated to the presidency of American Concertone, Inc., a division of Astro-Science Corp., Culver City, Calif.
- Ben C. Shipman has been appointed vice president-marketing of Weyer-haeuser Co.'s Rilco engineered wood products division, Tacoma, Wash.

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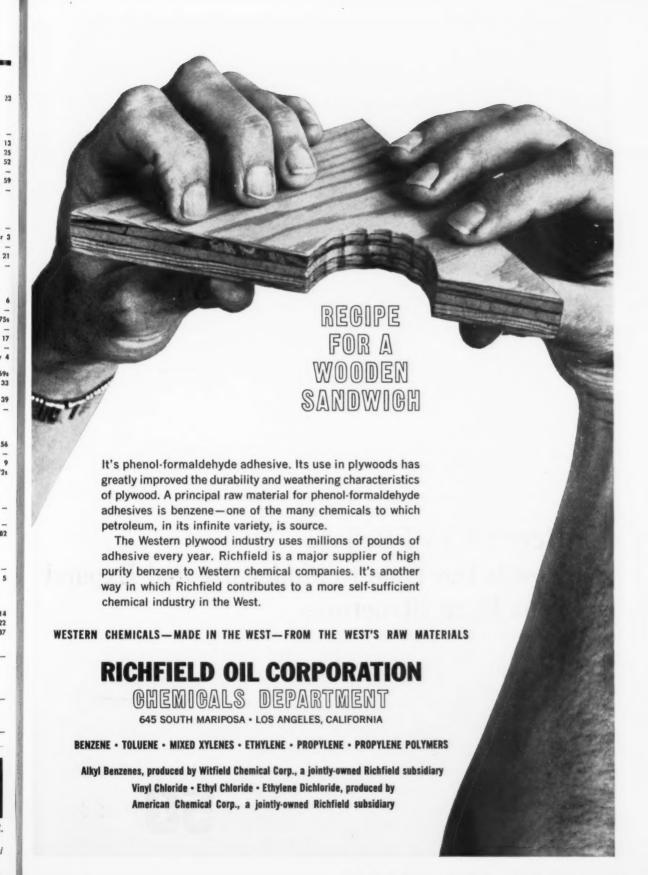
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